Scientific American.

A JOURNAL OF PRACTICAL INFORMATION IN ART, SCIENCE, MECHANICS, AGRICULTURE, CHEMISTRY, AND MANUFACTURES.

VOL. IV.---NO. 24. NEW YORK, JUNE 15, 1861. NEW SERIES.

Gigantic Revolving Cannon.

A good deal having been said in the papers about this piece of ordnance, we have procured a photograph from the model at the Patent Office in Washington, and herewith present an engraving, which is a very accurate reproduction of the photographic picture, with a description taken from the patent papers. The patent was granted to Thomas J. Mayall, of Roxbury, Mass., on November 27, 1860; and the invention is considered the most complete of a number patented by him for the same purpose. The gun is designed for use in fortifications, on shipboard, and in all other positions in which heavy ordnance is commonly em ployed.

The barrel, H, is supported by trunnions upon a turntable, D, by means of which it may be presented in any horizontal direction. Its vertical angle is regulated by a screw, Z', in the customory manner.—I is the many-chambered breech which receives an intermittent rotation in the interval between each successive discharge by means of a pawl, *m*, attached to a pivoted arm, *l*, taking into a ratchet wheel, *g*, upon the shaft of the rotary breech.

The cartridges are placed by hand into the hopper, *z*, and are, by an automatic rammer, *y*, forced into the chambers as they successively present themselves. The rammer works in guides, *w*, and is operated by a connecting rod, *u*, from a crank shaft, *t*, which actuates also, in a precisely similar manner, a sponging or swabbing device on the other side of the gun. Both rammer and swab are adapted by means of a bent lever, B', and internal springs, to automatically disconnect the rod, *u*, in case of meeting resistance from a previous cartridge which has failed to be discharged, and on the next motion the rod again engages, and the work proceeds as before.

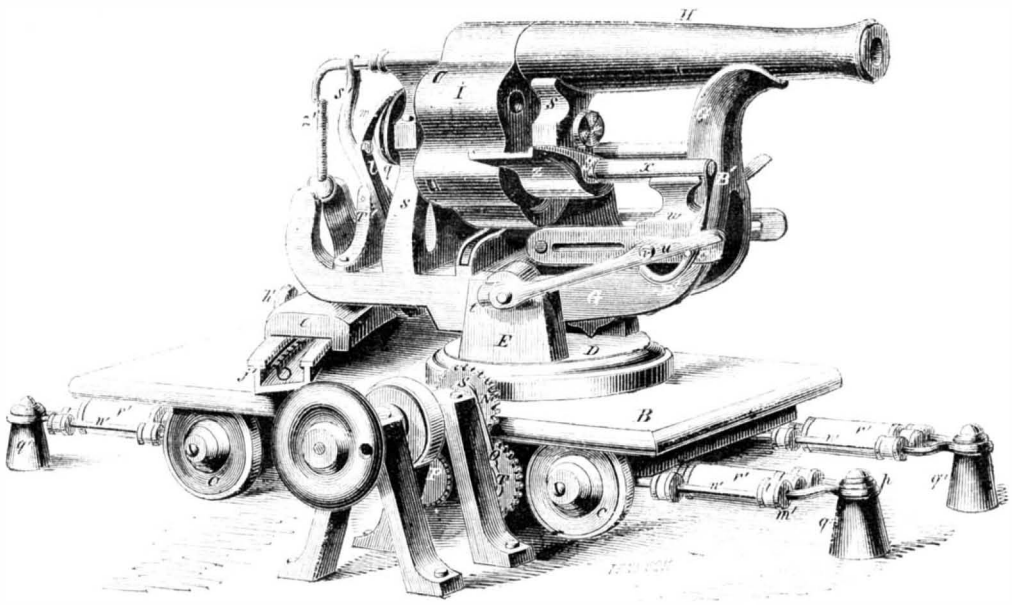
As each chamber reaches its uppermost position, so as to coincide with the barrel, the revolving breech is held by a catch, *p*, in the customary manner, and a wire passing through an insulating casing, *r'*, is driven through a touchhole in the rear of the chamber by means of a pivoted arm, *s'*, and a spark of electricity being then passed through the wire, explodes the cartridge. W is a stationary thumbing plate which covers the touchhole, excepting when in position to receive the fuse.

The arms, *l* and *s*, and catch, *p*, are operated by cams on a longitudinal shaft, *e*, which receives its motion through suitable gearing from the shaft, U.

The bed, B, upon which the table, D, turns, is supported on wheels, C.

On fortifications and on shipboard, the carriage, B C, is controlled by powerful springs, S, which take up the recoil when the gun is fired, and restore it to its former position. K is a shaft running in stationary bearings, and provided with a band, pulley or pinion. Motion is communicated from this shaft to the shaft, U, on the carriage, through the medium of gears, N O P, connected by links, Q R, so as to operate equally well in any relative position of the two shafts.

For field service, the springs, S, and stationary shaft, K, may be dispensed with.



MAYALL'S REVOLVING CANNON.

American Shells for Guns.

We have received a pamphlet written by W. W. Hubbell, Esq., of Philadelphia, in which he claims to be the inventor of the destructive explosive shell used in the American navy. He asserts that in 1840, he made a verbal agreement with Col. Bomford, chief ordnance officer of the United States, to introduce and manufacture his shell for the service, and that 100,000 have since been made. The agreement was to the effect that he should receive one dollar compensation for every shell made, but as yet he has never obtained any remuneration. Paixhan, the French artillery genius, who first introduced shell into naval warfare, preferred those of concentric form, and these are the kind now employed in all navies but our own. Hubbell's is an eccentric shell, claimed to be superior to those used in other navies, and it proved very destructive in blowing up the granite Bogue Forts near Canton, in China, a few years since, by our naval forces. Mr. Hubbell commenced his experiments with these shells in 1840, and on the 22nd Sept., 1842, he fired three 32-pound shells from the battery at Sandy Hook, by order of the Navy Department, in the presence of Commodore Wadsworth.

Formerly bomb-shells were all thrown by mortars—a short wide mouthed gun set at an angle of 45°. These shells were thrown at a great elevation, and their range was obtained by different charges of powder in a back chamber of the mortar. Paixhan practically introduced the system of discharging shells horizontally from cannon, similar to solid shot.

THE Buffalo (N. Y.) *Express* states that the canal steam propeller *Wm. Wells* lately made the trip from that city to Rochester and back, with 4,800 bushels of wheat, in 2 days and 3 hours. Towed by horses, it would have taken five or six days to perform the round trip of 190 miles. Five tuns of coal were consumed by the propeller, and about $20, in direct expenses, were saved.

Balloons in Warfare.

The adventurous aeronaut, Mr. John La Mountain, of Lansingburgh, N. Y., has, w understand, offerede his services to the government, to act as a scout, by reconnoitering the position of the enemy with his balloon. The proposition is not impracticable; the plan has been tried before with success. In the early part of the famous French Revolution, science and art were pressed into the service of the Republic, and the Academy of Sciences not only recommended it, but trained a corps of balloonists to attend the French army and make ascents to reconnoitre the positions of the Austrians. A balloon containing 17,000 cubic feet of hydrogen gas, was kept constantly ready to make aerial excursions; and just before the battle of Fleuris, in June, 1794, M. Contel ascended in this balloon and examined all the positions of the opposing army. The balloon was connected to the ground by a rope 7,400 feet long, and was allowed to rise that hight, and then drawn down by a windlass. This aerial observation enabled Jourdan, the French General, to dispose his forces in such a manner that he gained a complete victory.

On the day before the battle of Solferino, June 24, 1859, a balloon ascent was made to a hight of 3,500 feet by the brothers Goddard, of Paris, who made a reconnoisance of the position of the Austrians, and then descended with perfect safety. We quote these cases to show that, in calm weather, Mr. La Mountain may be able to make balloon ascents and spy out every position of the opposing forces.

VARIETY OF HUES IN THE VEGETABLE KINGDOM.—M. Chevreul, the distinguished French chemist and government dyer, has presented to the Paris Academy of Sciences the eleventh report of his researches on chemistry and dyeing. It consists of two parts:—1st, New proofs in support of the opinion maintained by M. Chevreul in opposition to many modern chemists, that the phenomena of dyeing are the result, not only of physical adherence, but also of a true chemical affinity; 2d, Of the influence of heat, light, steam, and of the mordant in the process of dyeing. He said it was only at the *Jardin des Plantes* that he could command complete collections of colors from the three kingdoms of nature, where the director of the School of Botany presented to his examination no less than 15,000 hues of leaves and flowers of all countries.

THE price of fire-arms in England has greatly advanced in consequence of the demand from the United States. The Enfield rifles, which cost formerly fourteen dollars, now sell for twenty-one dollars. As the old muskets rifled, which any of our machine shops would soon effect, are said to be equal to the Enfield rifle, we do not see why we should pay such an enormous price abroad for arms which can be so easily supplied at home.

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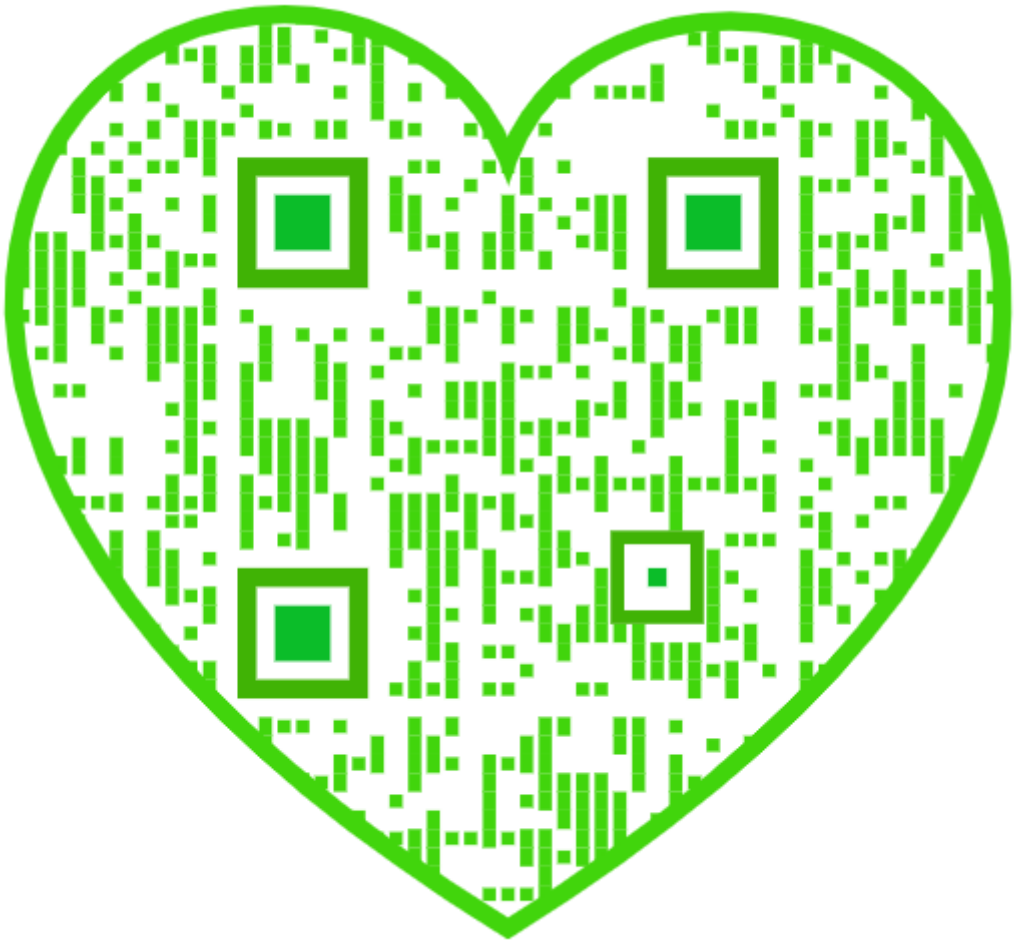

CHANGE OF MAIL DAY.

With a view of presenting the latest intelligence from the seat of war, we shall hereafter mail the SCIENTIFIC AMERICAN on Friday instead of Tuesday. By this change the SCIENTIFIC AMERICAN will have as late war news as any other weekly paper.

It is the intention of the publishers to keep up with the times, in news and in illustrations of new inventions pertaining to warfare, and at the same time, illustrate and describe all new inventions and discoveries which may be considered important in any department of mechanics or science. The publishers trust that all subscribers whose term for which they prepaid are about expiring, will renew their subscriptions.

THE WAR.

THE SLAVES AND THE WAR.

Our foreign subscribers, for whose especial benefit we make up this summary of the events of the war, will understand that while the real ground for the disunion movement was the disappointment of a set of politicians in obtaining the offices which they sought, the *pretext* was an alleged danger to the right of holding negro slaves. The present President of the United States was elected on the single ground of his opposition to the extension of slavery in the country over territory now free; an opposition shared by the great statesmen of all parties, from the earliest days of the republic. Davis and his confederates professed to see in this principle a danger to the continuance of slavery where it now exists, and on this plea a large party in a portion of the Southern States have been partly led and partly driven into Davis's monstrous scheme for destroying his own country.

As the question of negro slavery was the pretext for the war, the principal steps taken in connection with that institution form a very material portion of the history of the war. We have already published General Harney's letter and proclamation, showing the readiness of the government to return runaway slaves and its determination to put down slave insurrections with a firm hand; and on another page of our present issue will be found General McClellan's proclamation to the same effect. General Butler, of Massachusetts, when he arrived in Maryland with his forces, learning that a slave insurrection was apprehended, immediately offered the State authorities the aid of his troops in suppressing it, and the slaves who fled to him for protection he restored to their masters. On arriving at Fortress Monroe, however, and learning that the enemy were employing slaves to dig entrenchments, General Butler, who is a shrewd lawyer, with a very fertile intellect, determined that if he captured any more of them, he would hold them as *contraband of war*, provided they belonged to secessionists, while, if they were owned by loyal citizens, they should be promptly restored to their masters. Three negroes soon made their appearance, and when the owner sent to demand their return, General Butler offered to accede to the request, provided the owner would take the oath to support the United States government. As it happened that the first slaves who escaped belonged to secessionists, and were consequently not sent back, other slaves followed their example; and General Butler, in the course of a few days, had 135 of them at work in the fortress. Seeing the question was soon to be one of great magnitude, the General dispatched a messenger to Washington for instructions in relation to it. A Cabinet meeting was called, and it was decided to approve of General Butler's course. We give the text of the Secretary of War's dispatch announcing this decision:—

WASHINGTON, May 30, 1861.

SIR: Your action in respect to the negroes who came within your lines, from the service of the rebels, is approved. The Department is sensible of the embarrassments which must surround officers conducting military operations in a State, by the laws of which slavery is sanctioned. The government cannot recognize the rejection by any State of its Federal obligation, nor can it refuse the performance of the Federal obligations resting upon itself. Among these Federal obligations, however, no one can be more important than that of suppressing and dispersing armed combinations formed for the purpose of overthrowing its whole constitutional authority. While, therefore, you will permit no interference, by persons under your command, with the relations of persons held to service under the laws of any State, you will, on the other hand, so long as any State within which your military operations are conducted, is under the control of such armed combinations, refrain from surrendering to alleged masters, any persons who come within your lines. You will employ such persons in the services to which they will be best adapted, keeping an account of the labor by them performed, of the value of it, and the expenses of their maintenance. The question of their final disposition will be reserved for future determination.

SIMEON CAMERON, Secretary of War.

To Major-General Butler.

According to the latest reports over 100 slaves had sought refuge under Gen. Butler, and a general uprising was feared. What shall be done with these fugitives will therefore become an embarrassing question.

THE PRIVATEERS OF THE SECESSIONISTS.

The pirate vessels sailing under Jefferson Davis' letters of marque have been preying quite extensively on the shipping belonging to the loyal citizens of the country, but the blockade of the Southern ports being now complete, their plundering operations are brought to a close. The seizures made by the Confederates up to the last accounts may be thus enumerated :—

Off the different ports	12
In port	30
Steamers captured on the Mississippi	15
Total	57

On the 26th of last month there were under seizure, or as prizes in the port of New Orleans, the following vessels :—

SHIPS.

Name.	*Master.*	*Hail From.*
Abællino	Smith	Boston.
Ariel	Delano	Bath, Me.
American Union	Lincoln	Bath, Me.
C. A Farwell	Farwell	Rockland.
Express	Frost	Portsmouth, N. H.
Enoch Train (probably)	Burwell	Boston.
J. H. Jarvis	Rich	Boston.
Marathon	Tyler	New York.
Marshall	Sprague	Providence.
Milan	Eustis	Bath, Me.
Robert Harding	Ingraham	Boston.
State of Maine	Humphrey	Portland.
Toulon	Upsher	New York.
Wilbur Fisk (probably)	Pousland	Boston.

BARKS.

Chester	Bearse	Boston.
Ocean Eagle	Luce	Thomaston.

SCHOONERS.

E. S. Janes	Townsend	——.
Henry Travers	Wyatt	Baltimore.
Ella	Howes	Philadelphia.

Of the above vessels some doubt attaches to the seizure of the *Enoch Train* and *Wilbur Fisk*, but the probabilities are that they have been confiscated.

A BOMBARDMENT ON THE POTOMAC.

On the right bank or Virginia side of the Potomac, 55 miles below Washington, at the mouth of Aquia Creek, is the northern terminus of the Richmond, Frederick and Potomac Railroad. Richmond, the capital of Virginia, and now called the capital of the Confederate States, is 75 miles south of Aquia Creek, and as the latter is on the route from Richmond to Washington by railroad and steamboat, it is a place of some strategetic importance. The secessionists have accordingly erected some batteries here and supplied them with rifled cannon. On Friday, May 31st, two vessels in the service of the government—the *Freeborn*, a chartered steamboat, and the *Anacosta*, a one-gun steam tender belonging to the navy—commenced a cannonade on the batteries, which was continued till nightfall, and renewed the next morning; the attack in the morning being aided by the *Pawnee*, a steam sloop of war of 1,289 tuns and four guns. One of the batteries on the shore was silenced, but the one farther inland was out of reach of our guns. The *Freeborn* received two shot, one of which passed through the cabin, damaging some of the crockery, but not the vessel, except making a passage through the bulwarks of slight consequence. The *Pawnee* received eight or nine shot, but all too high to inflict much damage. One struck her maintopsail yard, which was thereby unslung, and another grazed the mizzen masthead.

A DASH INTO THE ENEMY'S LINES.

On the line of the Orange and Alexandria Railroad, 18 miles southwest from Alexandria, is the little village of Fairfax Court House. On the evening of the 31st of May, Lieutenant Charles H. Tompkins, of the second cavalry of the United States Army, stationed at Alexandria, having received orders to reconnoiter in the direction of Fairfax Court House, took with him 47 men of company B, and proceeded to fulfill his orders. Arriving within 300 yards of the village at about daylight in the morning of Saturday, June 1, they came upon a picket of the enemy, consisting of two men. One of these was taken prisoner and the other escaped. The cavalry company then charged into the village from the north side, and were fired on from the Union Hotel, formerly kept by James Jackson, who killed Colonel Ellsworth. The man firing on them was instantly shot down. The cavalry then charged down through the principal street of the village, and were fired upon from many houses, and from platoons behind fences. Having passed thus to the end of the village, they wheeled about and instantly charged back, and were then met by two considerable detachments, with a field piece. Turning, they cut through a third detachment in the rear, and left the village, bringing with them five prisoners. Lieutenant Tompkins reports his loss at three missing, three slightly wounded and six horses lost. Of the three missing, it seems that one was killed and two taken prisoners. Among the prisoners taken by the United States troops was Captain Washington, son of the late Major Washington, of the United States Army. He said that he did not wish to fight against the United States, and on taking the oath to support the government, he was released. The other four prisoners refusing to take the oath were detained.

A SECOND DASH—THE TWO DRAGOONS RESCUED.

Word was received on Saturday evening at Alexandria that two of the missing dragoons were taken prisoners, and were to be hanged in the morning. Company B was immediately summoned from their quarters, and mounting, rode up to the Court House, and having by some means ascertained the precise location of their comrades, made a dash through the village, and recovered the two men, whom they brought back in triumph to the camp at daybreak.

ADVANCES TOWARD HARPER'S FERRY.

Harper's Ferry is the most northerly point held by the secessionists in any considerable force, and consequently the first measure of government in beating back the rebellion would naturally seem to be the capture of this place. At last accounts, two strong bodies of Federal troops were apparently preparing to meet at the threatened point. The Pennsylvania volunteers under General Patterson were concentrating at Chambersburg, Pa., some 50 or 60 miles north of Harper's Ferry, while the Ohio, Indiana and western Virginia troops were advancing from the west under General McClellan. Two regiments of the latter force arrived at Grafton, which is 198 miles west of Harper's Ferry, on Sunday, June 3d. Finding that the secession forces stationed at this place had been driven away by the militia of the vicinity, and fled to Phillippa, 16 miles to the southwest, they marched down to attack them. The following is the telegraphic account of the affair, which must be received with the usual allowance for these first reports. It seems, however, to have been the most considerable skirmish that has yet occurred :—

CINCINNATI, Monday, June 3d.

Two columns of troops from General McClellan's command, one under command of Colonel Kelly, of the First Virginia Volunteers, and the other under command of Colonel Crittenden, composed of the Indiana Volunteers, left Grafton early last night, and after marching the entire night about 20 miles through a drenching rain, surprised a camp of rebels, 2,000 strong, at Phillippa, Va., and routed them, killing 15, capturing a large amount of arms, horses, amunition, provisions, camp equipage, &c. The surprise was complete, and at the last advices, the Federal troops were in hot pursuit of the rebels. It is probable that many prisoners will be taken.

Colonel Kelly was shot in the breast, but the ball has been extracted and there are some hopes of his recovery.

THE BLOCKADE.

We have telegraphic announcements that the ports of Mobile and New Orleans are now both blockaded by our fleet. The intelligence from Mobile is detailed and definite, the *Powhatan* having arrived at that place and given formal notice of the blockade. At New Orleans the Brooklyn has arrived, and there can be little doubt that by this time all, or nearly all of the Southern ports are efficiently blockaded.

A WRITER in the *United Service Magazine*, on Naval Coast Volunteers, says that naval volunteers occasionally secure a tug boat, put one gun on board, and take a short cruise for practice. Just now, this sort of practice would seem to be much more necessary in this country than in England, and we would recommend its adoption.

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Gen. McClellan's Proclamation.

Before the Federal troops crossed the Ohio river into Virginia, Major-General McClellan issued the following admirable proclamation, dated Cincinnati, Ohio, May 26 :—

To the Union men of Virginia :

VIRGINIANS :—The general government has long enough endured the machinations of a few factious rebels in your midst. Armed traitors have in vain endeavored to deter you from expressing your loyalty at the polls. Having failed in this infamous attempt to deprive you of the exercise of your dearest rights, they now seek to inaugurate a reign of terror, and then force you to yield to their schemes, and submit to the yoke of the traitorous conspiracy dignified by the name of the Southern Confederacy.—They are destroying the property of citizens of your State and ruining your magnificent railways. The general government has heretofore carefully abstained from sending troops across the Ohio, or even from posting them along its banks, although frequently urged by many of your prominent citizens to do so. It determined to await the result of the State election, desirous that no one might be able to say that the slightest effort had been made from this side to influence the free expression of your opinions, although the many agencies brought to bear upon you by the rebels were well known. You have now shown, under the most adverse circumstances, that the great mass of the people of Western Virginia are true and loyal to that beneficent government under which we and our fathers have lived so long. As soon as the result of the election was known the traitors commenced their work of destruction. The general government cannot close its ears to the demand you have made for assistance. I have ordered troops to cross the river. They come as your friends and brothers; as enemies only to armed rebels who are preying upon you. Your homes, your families, and your property are safe under our protection. All your rights shall be religiously respected, notwithstanding all that has been said by the traitors to induce you to believe our advent among you will be signalized by an interference with your slaves. Understand one thing clearly: not only will we abstain from all such interference, but we will, on the contrary, with an iron hand, crush any attempt at insurrection on their part.

Now that we are in your midst, I call upon you to fly to arms and support the general government. Sever the connection that binds you to traitors; proclaim to the world that the faith and loyalty so long boasted by the Old Dominion are still preserved in Western Virginia, and that you remain true to the Stars and Stripes.

The General's proclamation to his soldiers says :—

You are ordered to cross the frontier and enter on the soil of Virginia. Your mission is to restore peace and confidence; to protect the majesty of the law, and secure our brethren from the grasp of armed traitors. I place under the safeguard of your honor the persons and property of the Virginians. I know you will respect their feelings, and all their rights, and preserve the strictest discipline.—Remember, each one of you holds in his keeping the honor of Ohio and of the Union. If you are called upon to overcome armed opposition I know your courage is equal to the task. Remember, that your only foes are armed traitors; and show mercy even to them when in your power, for many of them are misguided. When, under your protection, the loyal men of Western Virginia shall have been enabled to organize and form, until they can protect themselves, you can return to your homes with the proud satisfaction of having preserved a gallant people from destruction.

A Regiment of Inventors.

A valued correspondent, residing in Missouri, writes us suggesting the idea of the formation of a regiment of inventors, to be armed throughout with patent articles—patent rifles, patent tents, patent knapsacks, etc., for the purpose of defending the Patent Office, the repository of their genius. He announces for himself that he can act in almost any capacity in the army—soldier, chaplain, or drummer, but would refuse the latter post unless supplied with a patent drum. He has seen eight years' service in the Austrian army, and has doubtless felt the crushing power of the iron heel of despotic rule. Strip all our soldiers of *patent* weapons of war, and arm a regiment of sturdy inventors with the best which their ingenuity has yet devised, and they would conquer peace in a short time, and compel Jeff. Davis to go about his business. Inventors generally are loyal and know the blessings afforded by a free government like ours, and are willing to shed their blood in ts defence.

GUNBOATS ON THE MISSISSIPPI.—The government is preparing in the West a number of gunboats to operate on the Mississippi. Some of these, it is said, will be cased with iron to resist the shot from the batteries erected upon that river. Others will be strongly built tug boats, strengthened for war purposes. One of the latter has already been put in use at Cairo. The Lower Mississippians feel very much concerned about these manifestations, and at New Orleans, particularly, there is a great deal of apprehension entertained of an invasion from above. Every little movement about Cairo is chronicled as soon as made, and a great deal more space given to events there than those transpiring near the seat of the Federal government. The Western movement will, no doubt, be a formidable one when it commences its work.

The Military Departments.

The following are the changes in the Military Departments and their geographical divisions up to date. There will be one or two more sub-divisions of the Eastern Department :—

Lieutenant-General Winfield Scott, Commander, Washington.

GENERAL DEPARTMENT OF THE EAST.—Commandant, Major-General Wool; headquarters, Troy, New York. Comprises the country east of the Mississippi river, and is sub-divided, and subject to contemplated sub-divisions.

DEPARTMENT OF WASHINGTON.—Brigadier-General Mansfield commanding. Headquarters at Washington. Comprising the State of Maryland, including Bladensburgh and Baltimore; the District of Columbia, by original boundary; Fort Washington and the country adjacent.

DEPARTMENT OF THE SOUTH.—Major-General Butler commanding. Headquarters, Fortress Monroe. Comprises Eastern Virginia, North Carolina and Tennessee.

DEPARTMENT OF VIRGINIA.—Brigadier-General McDowell commanding. Headquarters not established. Comprises Virginia east of the Alleghany Mountains and north of James river, excepting Fortress Monroe and ninety miles around.

DEPARTMENT OF ANNAPOLIS.—Major-General Cadwallader commanding. Headquarters at Annapolis. Embraces the territory twenty miles on each side of the railroad from Annapolis to Washington, as far as Bladensburg, Md.

DEPARTMENT OF PENNSYLVANIA.—Major-General Patterson commanding. Headquarters at Philadelphia. Comprises Pennsylvania, Delaware, and all of Maryland not embraced in the foregoing department.

DEPARTMENT OF THE WEST.—Brevet Brigadier-General Lyon. Headquarters at St. Louis, Mo. Comprises the country west of the Mississippi river and east of the Rocky Mountains, except those portions of it included in New Mexico.

DEPARTMENT OF OHIO.—Major-General McClellan commanding. Headquarters at Cincinnati.

DEPARTMENT OF KENTUCKY.—Colonel Anderson to command. Headquarters at Louisville, Ky. To include so much of the State of Kentucky as lies within one hundred miles of the Ohio river.

DEPARTMENT OF THE PACIFIC.—General Sumner commanding. Headquarters at San Francisco. Embraces the country west of the Rocky Mountains.

DEPARTMENT OF UTAH.—Colonel P. St. George Coke. Headquarters at Camp Crittenden (formerly Camp Floyd). Comprises the Territory of Utah, except the portion of it lying west of the 117th degree of west longitude.

THE CONFEDERATES ON WHEELS.—The government of the Confederate States left Montgomery by rail for Richmond, Va., one day last week, and arrived at the latter place without meeting with any serious obstacles, and put up at a hotel. Mr. Robert Toombs and a noisy fellow from Texas by the name of Wigfall, appeared as attachés of the government. This fact alone speaks *well* for the *personnel* of this moveable piece of furniture. We understand that General Scott has ordered it to remove again on or before the 4th of July next.

POSTAL ARRANGEMENTS.—Letters and newspapers on and after the 1st of June ceased to go South, except in Tennessee, Kentucky, Missouri, Delaware, Maryland, and some few counties in Western Virginia. The postages in other Southern States are as follows, provided a letter or paper can be got there to be started:

For letters, half ounce, within 500 miles	$0 05
For letters, half ounce, exceeding 500 miles	0 10
Weekly local newspapers, per year	0 40
Daily local newspapers, per year	2 80
Daily newspapers published outside the limits of the Confederate States	5 60

MILITARY HEAD-GEAR.—A writer in the New York *Post* says the thin cap covering now made and called a Havelock, was first introduced by General Sir Charles Napier. He set the example of wearing such a cap at the battle of Mearce, in Scinde, in 1843, fourteen years anterior to Havelock's exploits. The covers worn in India, he says, are generally wadded or quilted, which renders them far more efficient as protections from the sun's rays than the Havelocks, which, however, are very useful in their way.

THE artists of New York city have recently contributed to the patriotic fund in a generous manner. The pictures were numerous, and creditable to them. There were $4,498 realized from the sale, which was conducted by H. H. Leeds in his usual bland and winning manner. Mr. Leeds has a happy faculty of bringing out all the strong points of his case, and, coming of old revolutionary stock, his art of selling was fully aroused on this occasion.

TWENTY brass field-pieces, belonging to the State of Maine, are about to be rifled at Bangor by Messrs. Hinkley & Egery. Five of the cannon are now in hands for the rifling operation.

The Boston *Commercial Bulletin* states that the Massachusetts Arms Company at Chicopee Falls, are about to resume operations in a new building, upon an order for 5,000 of Smith's breech-loading rifles.

Another Packing for Shot.

It was our privilege, recently, to witness some experiments with a packing plate for shot, intended to close the windage and give the rifle or spiral motion to the projectile, the simplest and cheapest that we have yet seen. It is the invention of E. D. Williams, of Philadelphia, and consists simply of a cup-shaped piece of zinc, to be fastened to the bottom of the shot or the top of the wad with the convex side down. The pressure of the gases flattens it out, forcing the edge into the riflings, and the friction, under the great pressure, is sufficient to turn the shot with the plate as the latter travels along the grooves. The plate is formed with slits in the edge to enable it to expand more easily, and is made double, or of two plates, so that the slits may break joints.

Several shots were fired from a United States rifled musket, the projectiles penetrating a pine log endwise from eight to fourteen inches, from a distance of one hundred yards. About the same number of Minié shot were fired from the same gun, and the penetration averaged somewhat less than that of the shot with Williams' disk.

As this plate is applicable to any shot, large or small, round or elongated, and as it is the cheapest and simplest yet devised, it would seem destined to supersede all others, provided further experiment proves it to be effectual in closing the windage and rotating the shot. So far as the experiments go which we saw, they indicate that it is effectual in its operation.

A Hitch in Secession.

Governor Brown assures the people of Georgia that he has watched the case of Greiner, who was arrested in Philadelphia on a charge of aiding the enemies of the government, and if he is hanged, the valiant Governor will retaliate by hanging two citizens of such Northern State as shall hang one of the South. The Savannah *Republican*, commenting upon the announcement, reminds the Governor "that the President of the Confederate States alone possesses the power to act in the premises."

Oh, no, Mr. *Republican*, you are entirely in error. Governor Brown has seceded from the Confederate States on this subject, and will exercise the supreme authority of the State. Perhaps the next case that may arise, he will allow the Confederate government to manage. There is nothing like State rights. "In those days there was no king in Israel, and every man did that which was right in his own eyes."

USEFUL MATERIAL IN THE ARMY.—Our readers will remember that when the Federal troops from Massachusetts reached Annapolis, they found the railroad taken up and the locomotive taken to pieces, which they set about repairing without delay. On the advance of the army into Virginia, a proclamation was desired to be issued, which the town printers refused to print. Col. Wilcox called for printers among his men, and immediately he had enough to set up the proclamation and issue it, assuring the citizens that if they kept quiet they should be protected from any outrage or injury. An army composed of men so ready for anything required will make its way successfully wherever sent. It is made up from the workshops and farms of the North, and has no lack of means within itself to supply every want of the army.

The Seventy-ninth regiment left for Washington on the 2nd inst. It is commanded by Lieut.-Colonel Elliott, and is composed mostly of Scotchmen, able bodied and strong. Brigadier-General Ewen also accompanied this regiment. Its departure was witnessed by a vast concourse of people, who cheered it on its way with a hearty good will.

THE French government has put into the hands of the picked companies of the Thirty-third and Thirty-fourth regiments of infantry a new bayonet, which is to be extended to the entire infantry. It is shaped like a straight, triangular sword, deeply hollowed in the middle, with two grooves and a back underneath. The handle is of horn, ornamented with steel. The musket to which it is fitted is rifled, and the barrel is not so long as those of the rifles now used by infantry soldiers. Compensation, however, is made for that difference by the bayonet, which is 28 inches long, including the handle.

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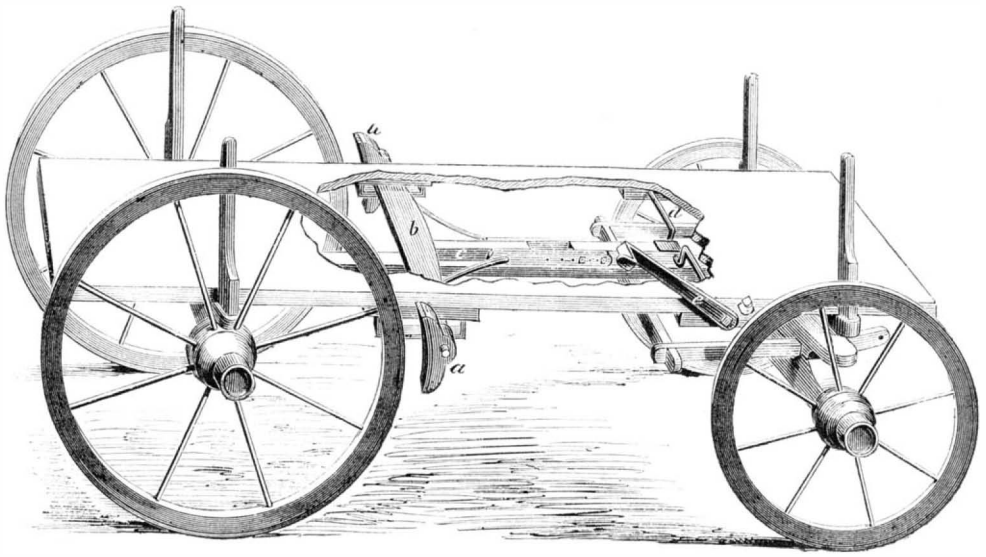
Improved Wagon Brake.

We here illustrate one of the very simplest and best wagon brakes that we have ever seen. It is operated by a crank and lever, so that the motion is rapid at first and diminishes in speed toward the end, increasing the purchase correspondingly, and finally bringing an enormous pressure upon the wheel.

Referring to the engravings, the shoes or blocks, *a a*, of the usual construction, are attached to the cross-bar, *b*, by a hinged joint, so that they will accommodate their rubbing surfaces to the contour of the wheel. The bar, *b*, suspended in suitable staples or guides to the body of the wagon, is connected by the rod, *c*, with the crank-shaft, *d*, which is rocked in its bearings by means of the foot lever, *e*. It will be seen that as the shaft, *d*, is turned, the purchase increases, as has been stated. The connecting rod, *c*, is constructed in two parts joined together by bolts, so that it may be varied in length to adapt it to the distance apart of the wheels, in case this is changed. The brake may be attached to the running gear if no body is used.

The patent for this exceedingly simple and efficient brake was secured, on the 29th of January, 1861, through the Scientific American Patent Agency, and further information in relation to it may be obtained by addressing the inventor, John A. Letts, at Trumansburg, N. Y.



LETTS' IMPROVED WAGON BRAKE.

Orange, Red and Yellow Colors from Coal Tar.

The following is the substance of a patent lately taken out in England by C. Cowper, of London. It relates to a new method of extracting colors from coal tar. The patentee takes a quantity of the solid pitch obtained from coal tar, which is placed in a clay retort and heated until the retort is red. In conducting this operation, a quantity of red-orange and resinous matter distills over toward the end of the operation. This resinous matter is then treated for 24 hours with cold fuming sulphuric acid, which dissolves it. It is now diluted with water, the excess of acid neutralized with chalk and the clear liquor filtered. This solution slightly acidulated and heated colors silk and wool a red-brown.

A beautiful yellow color is also obtained from the coal tar as follows :—Sulphuric acid, as free as possible from nitrous vapors and sulphate of iron, is heated in a water bath, or in a glass or earthenware vessel, to about 190° Fah. The orange-red matter is then added gradually to the extent of about one-ninth the weight of the acid—*i. e.*, nine parts of sulphuric acid to one of the orange-red matter. When it is found that, by throwing a small quantity of this mixture into water, it is dissolved, the heat must be removed. To promote the action of the acid on the coloring matter, the mixture should be continually stirred during the operation by means of a glass spatula. If neutralized by means of carbonate of soda, a yellow dye is obtained principally for dyeing silks, which is purified in the following manner :—The mixture of the coloring matter with sulphuric acid is diluted with water ; it is then neutralized by means of carbonate of lime. After having removed the sulphate of lime again by washing and filtering, the yellow solution is heated to boiling point, and small quantities of hydrate of lime are gradually added, until it is found that, by pouring a small quantity of the yellow solution into a solution of protochloride of tin, a brown powder becomes precipitated. The yellow solution is allowed to cool completely. After separating from it the brown precipitate, by filtering and washing, the yellow solution is again heated to boiling point, and is acidulated with pure hydrochloric acid (muriatic acid). A solution of albumen or gelatine is then added, in small quantities, until it is found that the yellow solution, when filtered and heated to boiling point, colors silks a pure yellow.

Antidotes for Insect and Snake Bites.

A late number of the American *Journal of Medical Science* contains an article from Dr. Irwin, Assistant Surgeon of the United States Army in Arizona, on an antidote for the poison of the rattlesnake. These venomous reptiles, and other snakes, are very plentiful in Arizona, but Dr. Irwin never heard of a native dying from their bite. This led him to make inquiries on the subject, and he found that the people had a most effectual remedy in the *gollindrinera*, an herb growing abundantly in the southern portions of Texas, New Mexico and Arizona. He sent a specimen of this plant to Dr. Torry, of this city, who pronounced it to be *euphorbia prostrata*. Its stem is delicate, and a milky white juice pervades all its parts. Dr. Irwin made quite a number of experiments with this plant to test its virtues on dogs that had been bitten with snakes. These trials fully established its reputation as an antidote for the poison. The medical properties reside in the milky juice of the plant, and by bruising it in a mortar with a considerable quantity of water, he obtained the extract. This was given internally in small doses, while the bruised plant itself was applied externally to the wound. Respecting the virtues of this plant, Dr. Irwin says : "One of the strongest arguments that I may adduce in favor of the *euphorbia prostrata* is that, amongst the Mexican population of Arizona and Sonora, who are frequently subjected to poisonous wounds from the rattlesnake, coral snake, 'vinegrilla' (*thelyphonus*), scorpion, centipede, tarantula, and a host of other hideous creatures, in no instance does the injury result fatally, as they resort at once to their specific, which never fails to produce a sure and speedy cure. In the hands of unscientific persons, I look upon it as an invaluable specific."

In the Southern States the common method of treating persons bitten by snakes is to make them intoxicated with rum. On page 355, Vol. XII. (old series), of the Scientific American, a correspondent residing at Centerville, Miss., states that the best remedy he ever saw tried for snake poison is whisky and red pepper. A table spoonful of the pepper is added to a pint of whisky. This quantity will generally cure a full grown man who has been bitten; two such doses, at the most, will certainly effect a cure. This is a common remedy in various parts of Mississippi.

In a recent number of the London *Engineer*, it is stated that Dr. Cloquet, of Paris, lately read a paper before the Academy of Science on the poison of snake bites, in which it was stated that Dr. De la Girenniere, of Manilla—a place where deadly serpents of various sorts and sizes are very numerous—had cured those bitten by snakes with wine, by giving the patients a sufficient quantity to produce intoxication.

Liquid ammonia is a common antidote for the bite of poisonous insects. It is applied externally to the wound, and a small phial full of it, carried by a person exposed to insect or snake bites in our Southern States, will be a great safeguard against dangerous and fatal results. It is now believed by many persons that the poison of snakes acts upon the nervous system and disorganizes it, hence the efficacy of alcoholic liquors as a counteracting agent in preventing such disorganization. The foregoing information should be carefully treasured up by all who are exposed to danger from the bite of snakes.

Railroad Property.—Railroad property, says the Philadelphia *Ledger*, seems to suffer more from internal war than any other species of property. Beside the loss of its regular business from a disturbed condition of public affairs, and the liability to be taken possession of for military uses, the first thing a defensive army does is to destroy all the bridges as the invading army advances. The bridges on the Northern Central, and on the Philadelphia and Wilmington road were burnt on the very first movement of troops Southward. Through the energy of the managers, they have been repaired, but have to be guarded continually. The bridges on the Baltimore and Ohio railroad are all ready to be destroyed as soon as the Federal troops move toward Harper's Ferry.—Since the Federal troops have crossed into Virginia, the work of destruction has extended on the Alexandria, Loudon and Hampshire road, the national troops have burnt bridges, variously stated at eight and eleven, and have torn up the rails, at intervals, over a space of many miles. The object of this proceeding is to prevent the approach of attacking forces from Harper's Ferry. The bridges beyond the line of their operations have been destroyed for several miles by the Virginia troops, to prevent the Federal forces from advancing any further South. Though railroads are great facilities for mustering our forces together, they cannot be considered of much importance for army operations in the territory of the rebellious States. But to the same extent they destoy railroads, to keep the Federal forces from following them, they also impair their own facilities, for moving about rapidly to various points threatened with danger. Portable bridges, with car loads of rails to follow after our army, would enable them to repair damages as they advance, and keep up a continuous communication as far as they progress.

Iron in Buildings---Useful Rules.

The London *Building News* publishes an abstract of a very useful paper by Mr. Wm. Stubbs, lately read before the Liverpool Architectural Society. We quote the following extracts from it :—

The golden age is past: we are now in the age of iron. * * * It may be truly said that gravity is the ultimate source of all the strains that arise in buildings, but for convenience it is necessary to resolve the resultant into compression and tension. It was formerly usual to employ iron chiefly to resist the latter, but economy of space and length of bearing have brought both into its service. * * The first point to be ascertained by an architect with a casting of iron is to find out what it has to do.

The practical man wants simple tools. Science is always consistent with successful practice, therefore simple rules are sufficient. The following for iron pipes of ordinary sizes answers well, and it never has been published before. It is based upon the fact that a 10-inch pipe one inch thick will stand the pressure of 100 yards head of water. The coincidence of one inch of metal to every 10-inch diameter and 100 yards pressure should be remembered. For every inch in the diameter of pipe, increase or deduct one-tenth of an inch, and for every yard of pressure increase or deduct one hundredth of an inch.

In calculating the strength of columns great care is necessary. The safe plan is to find the diameter of a solid column necessary to bear the compression, and then distribute the same area of metal in tube form as a hollow column. * * * A solid column 10 feet long, and having an area of 10 square inches (good metal), will bear 10 tuns pressure. This rule can be conveniently carried out, and it is safe and practical. It is really not so much what we know as what we can successfully use that is valuable in science and art.

On the morning of the 21st of May, the boiler of the steamboat *Kentucky* exploded at Columbus, Ark., just as the boat was leaving the wharf. The floor of the cabin was torn in pieces, and dense volumes of steam, with a column of boiling water, poured in. Twenty-five persons were killed and five fatally injured. It is stated that the boiler had been tested a short time previously, and stood a pressure of 200 pounds to the square inch.

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Improvement in Making Gunpowder.

It is well known that saltpeter (nitrate of potassa) is the most expensive material that is employed in the manufacture of gunpowder.

Saltpeter is obtained in small quantities from accumulations due to the presence of urinates, and formations on the surface of the ground in a few places. Hence, in times of peace, nations lay up stores of saltpeter for seasons of war. The office of saltpeter is to furnish oxygen to the charcoal of the powder. The nitrate of soda can furnish an adequate amount of oxygen, and as this salt is obtained in unlimited quantities in some sections of South America, and other places, R. Oxland, of Plymouth, England, has patented a method of purifying it so as to employ it as a substitute for nitrate of potash in making gunpowder. The crude article is first ground fine, then placed in a conical vessel having a bottom pierced with holes. Water is then poured over the mass in this vessel, and the more soluble impurities in it, such as common salt and the sulphate of soda, are dissolved and trickle down through the perforated bottom, and the insoluble nitrate of soda left is thus, in a measure, purified; but it has to undergo still further purification.

The mass of nitrate is now taken from the conical vessel, drained, and dissolved with water in another vessel highly heated by steam. To a saturated solution of it, pure carbonate of soda in solution is now added. This precipitates more impurities. The clear liquor is now filtered through bags, in the same manner as sugar sirups, after which the purified nitrate solution is rapidly boiled down in an iron pan; as the salt falls to the bottom, it is taken out, drained, and afterwards thoroughly dried in a warm apartment upon heated earthenware plates.

The nitrate of soda, thus purified, is used in manufacturing gunpowder in the proportions of—

Nitrate of soda	85 parts.
Sulphur	16 "
Charcoal	18 "

The coke of bituminous coal, containing a small amount of ashes, may be employed as a substitute for charcoal, in which case 20 parts of it (the others being in the above proportions) may be used. These materials are mixed according to the common modes of making gunpowder. This is a very important improvement, as, by the use of nitrate of soda, gunpowder may now be manufactured in unlimited quantities, which was not the case heretofore, as we have been chiefly dependent upon the East Indies for our supply of niter. The chief objection to the nitrate of soda, as a component part of gunpowder, is due to its slightly deliquescent nature, but, treated as described, it is said to be almost free from this objection.

Composition for Jewelry and Picture Frames.

A patent has been recently taken out in England by J. Smith, of Birmingham, for making colored compositions for jewelry. The composition is made as follows:—

Take one pound of shellac and melt it on a flat iron slab, then mix it with an equal quantity of the dust of ebony wood, and add three ounces of asphaltum, in powder, and three ounces of ivory black or charcoal, also in powder. This composition forms jet-black articles of jewelry, or it may be used for making boxes, &c.

In making a composition for articles of a chocolate tint, three ounces of brown asphaltum and one ounce of rouge are mixed with the lac.

For light-colored compositions, to imitate cameo-shell articles, boxwood dust is mixed with the shellac in the same manner as the ebony, and any coloring pigment may be used.

The whole of these ingredients are thoroughly incorporated together when a homogeneous compound is desired. If a streaked or veined composition is required, it is produced by twisting or rolling two different-colored masses, whereby imitations of malachite, onyx, and other stones may be manufactured. When the composition is warm and plastic, it is taken off the iron slab and placed in warm dies, and submitted to pressure, to strike the different articles into form. Barytes and oxyds of manganese may be added to the lac to give greater density to the composition. To give very great tenacity and prevent brittleness, some paper pulp is added. This is a good composition for the ornamental frames of photographic pictures, and a number of other purposes besides jewelry.

The Alcoholic Treatment of Wounds.

Mr. A. Prichard, of Bristol, states (*British Medical Journal*, November 3d, 1860) that his attention was called a few months ago to a pamphlet published in Paris by MM. Batailhe and Guillet, bearing the title "Alcohol and Alcoholic Preparations in Surgery," in which the authors sum up the advantages of applying strong alcoholic compounds to recent and other wounds in the following way, viz., that they check or prevent suppuration, and consequently phlebitis and pyæmia, and that they favor union by the first intention; and the facts brought forward, although few and meager, induced me to give the plan a trial; and I will briefly narrate some of my cases.

The particular alcoholic preparation which was recommended was the compound tincture of aloes, or, as the French call it, *elixir de longue ven*, and it is made of aloes, myrrh, saffron and spirit. It is said to be most valuable in contused and lacerated wounds, involving various tissues, being particularly useful in lacerated wounds of the hand, when tendinous, muscular, cutaneous and osseous tissues are often damaged together. But, that there may be no questions about originality or priority of the discovery of this method of treatment, I will quote a paragraph on the subject from that most entertaining and valuable work, "John Bell's Surgery." He says:—"The process of saving the hand of a workman, when thus mangled with his tools, is this: You are to take up the arteries first, then return the bones into the wound if they project; stitch the skin over them, draw together the open spaces with slips of adhesive plaster, and dress the outside by dipping pieces of lint in camphorated spirits and laying them along the wounds"—with a bandage afterwards, and a splint if necessary.

Hay Making.

As the season for making hay is approaching, we publish the following discreet advice to farmers from the Ohio *Farmer*:

Don't dry your hay too much. Hay may be dried till it is as worthless as straw. As a good coffee-maker would say, "Don't burn your coffee, but brown it; so we say, don't dry your hay, but cure it. Our good old mothers, who relied upon herb tea instead of "'pothecary medicine," gathered their herbs when in blossom, and cured them in the shade. This is the philosophy of making good hay. Cut in the blossom, and cure in the shade. The sugar of the plant, when it is in bloom, is in the stalk, ready to form the seeds. If the plant is cut earlier, the sugar is not there; if later, the sugar has become converted to woody matter.

Hay should be well wilted in the sun, but cured in the cock. Better to be a little too green than too dry. If, on putting it into the barn, there is danger of "heating in the mow," put on some salt. Cattle will like it none the less.

Heat, light, and dry winds, will soon take the starch and sugar, which constitute the goodness of hay, out of it; and with the addition of showers, render it almost worthless. Grass cured with the least exposure to the drying winds and searching sunshine, is more nutritious than if longer exposed, however good the weather may be. If ever cured, it contains more woody fibre and less nutritive matter.

The true art of hay-making, then, consists in cutting the grass when the starch and sugar are most fully developed, and before they are converted into seed and woody fiber; and curing it up to the point when it will answer to put it into the barn without heating, and no more.

Smelting Works near Paris.

F. A. Artault, the Paris correspondent of the *Lake Superior Miner*, under date Paris, March 22, says:

Lately, in company with the different owners, I have been visiting several large and very complete establishments for smelting, in the neighborhood of Paris, and I was delighted and astonished with their grandeur and extent. I have seen the construction of their furnaces, the copper liquid put up with ladles into the ingot frames; at some places they make ingots of from 100 to 1,000 pounds; then in the same establishment where they smelt copper, they have fine engines of 40 to 50 horse-power, running heavy hammers, cylinders, scissors, &c., where they manufacture the copper from a heavy ingot to fine sheets, wires, pipes, plates, &c., in a word, in every form. The capital employed in these establishments—buildings, furnaces, machinery, tools, etc., varies from $60,000 to $150,000, and they employ from 30 to 100 men each. Everything, in every department, is conducted with great care and order. An able engineer, chemist, and metallurgist is the director of each establishment, and superintends all the work. In Europe, the French workmen are known for their skill in the preparation and manufacture of metals; the workmen receive from 80 cents to $1 20 per day. The coal costs at the furnace $8 to $9 per ton, and often contains much sulphur, which is a nuisance for the smelting copper. These smelting establishments are supplied with minerals from Chili, Peru, and Bolivia, in South America, and also from Spain, Algeria, Corsica, and Italy.

THE Duck Mills, at Paterson, N. J., have orders from government for as much cloth as they can manufacture for nine months to come. The heavy duck is used for sails; the light kinds for tents.

Surface Condensers of Steam.

The engines of steamships are all low-pressure. The steam, after acting upon the piston, is exhausted into a close vessel, where it comes in contact with a shower of cold sea water, and is condensed. This creates a vacuum in the condenser about equal to 12½ lbs. in most cases, which is a considerable saving of power in comparison with exhausting against the atmospheric pressure of 15 lbs. on the square inch. The early steam engines were so made that the steam was condensed by water applied on the outside; but from the days of Watt outside condensers have almost been used exclusively, and when pure water can be obtained they are the best. But for marine engines, the boilers of which are fed with salt water, outside condensers, in principle, are the best. The condensed steam in an inside condenser, being pure water, it will save about 13 per cent of heat when fed into the boiler, because it never requires to be blown off, like saturated salt water. The principal objection to surface condensers has been the slow action of condensation, by applying the water on the outside of the metal instead of bringing it into actual contact with the steam. A perfect surface condenser has long been a desirable object, and several American and European inventors have been engaged upon the question, and have invented condensers of various degrees of merit, some of which have been quite successful.

A paper read upon this important topic before the Institution of Engineers in Scotland, by T. Davison, has been published in the London *Engineer*. Its author considers that surface condensers have now become positively necessary for saving fuel on sea voyages. A complete revolution is now going on in the new steamers built in Great Britain. Most of the leading engine builders, such as Penn, Maudslay, Napier, Thomson, Randolph & Elder, and a number of others, are putting surface condensers into all their new engines.

Arsenic in Common Life.

We have received a pamphlet on this subject by Charles H. Porter, M. D., Professor of Chemistry and Medical Jurisprudence in Albany (N. Y.) Medical College. The object of its author is to point out the dangers arising from the use of various articles that are very commonly employed, containing arsenic. These chiefly consist of wall paper, colored with Scheele's green.

His assistant, Dr. Oscar H. Young, has analyzed several papers, and they actually contain from 8 to 62 grains of arsenic to the square foot. Within the past few years he has met with several cases of severe indisposition in persons who occupied apartments the walls of which were covered with such paper. Green window shades, green paper boxes, the green leaves of artificial flowers, Scheele's green paint, and articles of confectionary colored green, are all dangerous. Textile fabrics, such as fine muslin, are sometimes colored with arsenic green; these are also dangerous if used for articles of dress.

Dr. Porter is the first American chemist who has given this subject a full scientific investigation.

TO REMOVE STARCH FROM COTTON CLOTH.—M. Paraf, of Paris, employs the following method of removing starch from cloth: For 665 yards of cloth, an infusion is made of 1½ lbs. of malt in two gallons of tepid water. This is then filtered, placed in a vat of water at 50° Fah., and the pieces of cloth steeped in it from twenty to thirty minutes. The malt converts the starch into dextrine and sugar, which are soluble, and can then easily be washed out with warm water. This improvement is of more value than most persons would suppose. Finished pieces of white cotton and linen cloth intended to be colored are very liable to take on the color in spots, owing to the starch adhering to the fabric, because it is not soluble in water. This simple improvement will afford a remedy for this evil.

DRESS FOR SOLDIERS.—It is suggested that a more suitable dress for soldiers could not be found than to adopt those used by sportsmen, viz., a coat to come down just to the hips, with large pockets, made of strong brown fustian, and pantaloons of the same material. For rough and tumble usage there is nothing stronger and better, while for color nothing could be more admirable.

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Correspondence

LETTER FROM OUR WASHINGTON HOUSE.

WASHINGTON, May 30, 1861.

MESSRS. EDITORS :—The rapid succession of events which have transpired since the bombardment of Fort Sumter, seven short weeks ago, have kept our community in a state of feverish excitement, unfavorable to business or anything else except the cultivation of the martial spirit. Now, however, a state of feeling has succeeded which, though none the less earnest and determined, has in it more of calmness and patience as the vitality of the government is manifested. The veteran commander-in-chief has remarked that the only General he has any fear of is *general impatience;* but even this opponent is rapidly yielding before the well-planned and well-timed movements of our army. It is said that the President himself complained a few days ago to General Scott that he thought the policy of the latter too slow, but the General reminded him that this is not a Mexican war, and intimated that if he was to command the army of the United States he must do it in his own way.

In the Patent Office, matters have returned to their accustomed routine. The business of the Office has fallen off much less than was anticipated. This accords with an idea expressed by you in a recent issue, that invention is usually active during a period of war.

The troops recently quartered in the model rooms of the Patent Office succeeded in breaking fully four hundred panes of glass during their short stay. This damage was easily repaired ; but another evil resulted from it, the inconvenience of which is only now beginning to be felt. It appears that the ready access thus afforded to the interior of the cabinets, formed too strong a temptation, and some models were abstracted ; how many it is impossible to say. Such as are missed hitherto are articles of no great intrinsic value, but their loss for purposes of reference may, in some instances, prove very serious. The soldiers doubtless regarded them as placed there merely for exhibition, and did not appreciate their value as legal evidence in connection with the patents which they represented.

A recent trip through Maryland and Delaware enabled us to observe a little the state of public feeling in these States. The Union sentiment is decidedly in the ascendant, and in some localities recruiting goes briskly on ; but even in the ranks of these avowed Union men are many who regard this attribute of both the States named rather from necessity than choice. Secession is bolder there than in this district, where the presence of an overwhelming force of patriots in arms holds treason successfully in check ; but there, as in other border States, a great disposition is manifested to be on the *strong side*, and this feeling will continue to reduce the numbers of the disaffected until concord is finally restored.

The front of the United States forces in Virginia in this neighborhood are now so near the secession posts at several different points that a conflict within a few days appears almost inevitable, unless the latter continue to retreat. Much was said by the Virginians in reference to the supposed unwillingness of our District militia to "invade the soil" of that State; but when the trial came, none were found more willing to go wherever duty to their country calls them. In many instances, when companies have been ordered across the river, the authority of the officers has been scarcely sufficient to keep back those required to mount guard at the respective armories.

Parties at a distance, knowing but little of the practical details connected with the movement of armies, are sometimes impatient with the commanding officer for not pushing his soldiers forward more rapidly.

The chief obstacle in the way of the United States troops advancing on Virginia, by land route, arises from the want of means of transportation. To move an army of 25,000 men, at least 500 heavy four-horse wagons are required, and 2,000 horses. The number of horses now here under the control of the Quartermaster's Department is less than 1,000. Our Northern friends will therefore perceive that their frequent complaints against General Scott, for inactivity, is not well founded. The General "knows what he is about," and will soon satisfy even the most incredulous that he is fully up to the emergency of the case.

It will be recollected that, during the early rush of troops to defend Washington, the Capitol buildings were occupied by soldiers. The walls are now undergoing reparation. They were not materially injured by its occupation by the troops, though somewhat defaced in respect to their mural decorations.

The Gunboat Pawnee.

MESSRS. EDITORS:—I offer for your paper some data of the *Pawnee.* For more than two years past almost entirely withdrawn from flotative development in merchantable vessels, I have been engaged in illustrating the utility of a union of science with practice in naval constructions.

My proposal to the government in 1858 being accepted, I was directed to prepare plans for one of the three smaller of the seven gunboats, the draught not to exceed ten feet. The four of larger class were to have thirteen feet draught. It was assumed that, as the draught of three was to be small, the vessels would also be small ; but it was soon discovered that the *Pawnee* was to be the largest of the seven, and, of course, she was pronounced a failure before the keel was laid. The wish being parent to the expression, was readily exchanged by the reporters at par, and the libellous paragraph was heralded by land and sea. To secure suitable accommodations with so light a draught of water, it was necessary to make brakes in the main deck both forward and aft; with this arrangement, I obtained 1,533 tuns of displacement within the 10 feet, the *Narragansett* and *Seminole* having about 1,000 tuns, and those of 13 feet draught, about 1,400 tuns displacement. With this difference in bulk and weight, the question of propulsion was of much consequence, to meet which, I asked for two screw propellers of 9½ feet in diameter, one screw not furnishing sufficient thrust area. The steam indicated horse-power of the larger draught vessels, to each tun of displacement, was about 73 per cent ; that of the smaller class, about 75 per cent, with the exception of the *Pawnee*, which was 72 per cent of the displacement, giving 1,100 horse-power.

The plans of the vessel seemed to be little cared for in connection with her proposed battery, while the question of best plan of machinery was wholly lost sight of, and the paramount question of who should have the contract was finally settled, while the excessive space required beyond the allotment was deemed of no consequence, of which I was kept in ignorance until the vessel was far advanced, and, when nearly ready to launch, was directed by the Chief of the Bureau of Construction to make room for the encroachment, to the serious detriment of the vessel, occasioned by moving the iron bulkheads off from the floor heads.

In order to develop the contracted power of these engines, several trial trips were made, when it was found that, instead of developing 1,100 indicated horse-power for six consecutive hours at sea, under the most favorable circumstances, about 800-horse power was all that could be obtained, after nearly a year's detention beyond the contracted time of delivery. During this interval the armament and complement has been increased, until the displacement has reached nearly 1,700 tuns with full bunkers of 260 tuns of coal. One of the effects of deranging my plan has been to make the vessel too quick in the time of her roll for efficiency in a beam sea ; the roll has not, however, been sufficient to move a glass from a state room bureau, or a spittoon upon deck, and can be regulated as readily as the pendulum of a clock, when an opportunity shall have been afforded me of rendering that service. The *Pawnee*, as a sailing vessel, like all others of light draught, cannot be weatherly, nor yet fast, with a minimum percentage of sail and dragging two four-bladed propellers through the water.

But, speaking of the *Pawnee* as a screw steamer, that vessel has not yet been built which, with a displacement of 1,533 tuns within a mean draught of water of 10 feet, can accompany her, and, under steam alone, accomplish an equal distance in a given time, consuming an equal quantity and quality of coal—the best test of the value of models. As I have never been informed, it would be satisfactory to know the standard by which the *Pawnee* was adjudged a "failure," since it cannot be by the performance of the *Narragansett* or *Seminole*, vessels of the same draught of water, about half the armament and complement, and a moiety of her speed. But, notwithstanding the *Pawnee*, like the *Ohio* and *Niagara*, has been called a failure because built by an "outsider," it may be gratifying to know that, though the vessel has been shorn of her proportion of steam power —engines not adapted to the vessel have been placed in her, and her constructor's plans have been mutilated—yet her model has proved itself to be one of the grandest naval triumphs of the age, and the principles developed will be adopted when the puny efforts of envy, so signally shown, shall have become powerless for harm. Very truly yours,

JOHN W. GRIFFITHS.

The Hinder Part of Planes.

MESSRS. EDITORS :—On page 246 of the present volume of the SCIENTIFIC AMERICAN, a correspondent gives it as his opinion, that all that part of a plane behind the iron "is of no use." He says "no effect can be produced by the hinder part, for it is always at a distance from the board, equal to the thickness of the shaving."

Now, this is certainly a grave error. In the first place, the iron is not generally so wide as the face of the plane stock by a quarter of an inch on each side, consequently the shaving is not taken from that portion of surface over which these sides pass ; and if the face of the plane is true from one end to the other, these edges, behind the iron, rest as firmly on the board as the fore part, leaving a depression in the board, immediately behind the iron (but no wider than the bit), the exact thickness of the shaving. But as this portion immediately in the rear of the iron does not come in contact with the wood, it does not wear away, while the forward part and narrow edges soon wear away the thickness of a shaving, leaving the hind part resting firmly on the wood, in the recess from whence the shaving is taken.

The hinder part is not only of use in preserving "the level when the iron is nearly at the end," but is of material advantage in reducing the inequalities of the board, as it rests on a more even surface than the forward part, consequently we might as consistently dispense with the forward part of planes as the hinder part, but let us discard all such

IMPROVEMENTS.

Mitchell, Iowa, May 30, 1861.

Mode of Cleaning Guns.

MESSRS. EDITORS :—Being a constant reader of your invaluable paper, and noticing on page 314 of the present volume, a device for washing muskets, &c., which does not strike me so favorably as the mode made use of by me for upward of forty years, and supposing at this time of our country's trial the most trivial thing will advance its interest—the simpler the better will it be of use—I am inclined to say that for over fifty years almost my only pastime from my business pursuits has been hunting, and ever since cut wads were first introduced, I have been in the habit of cleaning my gun with a stout leather cut wad, one size larger than the bore of my gun, and about one-eighth of an inch thick, and when not so thick I have added others so as to make it of suitable thickness. These I have attached firmly to the worm on the bottom of my ramrod. I then place the butt of my gun into a gallon or more of hot water, dip the end of the rod containing the leather wad into it, then insert it into the bore of my gun, and draw it up and down much like the operation of a pump, and when the rod was withdrawn quickly, it would report like a pistol. I then turn my gun upside down to dry, and in a little time the heat retained in the barrel will complete it. I then put a little boiled linseed oil on a rag and rub it over the barrel, stock, and all exposed parts of my gun, and have always been well satisfied with this method of washing my gun. Everything being ready, I think I could thoroughly wash sixty an hour. E. J.

South Boston, May 28, 1861.

WILSON'S "Business Directory," for 1861-62, is now issued. It contains a complete list of all the trades of this city, and is a most convenient work. It can be obtained of John F. Trow, No. 50 Greene-street, this city.

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A Spirited Contributor.

MESSRS. EDITORS :—Please consider me a subscriber to your paper in future, till further notice. I should like to have the back numbers from the 1st of May. Enclosed you will find $2 in payment for it, for one year. This will make up for the loss of the rascal, whose letter and advertisement you published last week. Yours, truly,

HENRY W. BILL.

Troy, N. Y.

[We have much pleasure in publishing the above note, and should be glad to get thousands more of the same sort. The SCIENTIFIC AMERICAN has never been, in any sense, a political journal, and we have no intention of making it such at this time; but when a beneficent government was threatened with overthrow by armed violence we promptly came to its defence. We regarded it as incumbent on all good citizens to use their influence in all proper ways and at all hazards, to support the government thus in peril. We had thousands of subscribers in the seceded States, yet this did not deter us from denouncing secession as a vile conspiracy, hatched by a few traitors, and palmed off by systematic intrigue and deception, upon an unsuspecting people, for the purpose of destroying the government. No man possessed of a spark of patriotic love of country should keep silent in times like these. We abhor the mischievous designs of traitors and fanatics of every name and of every section. We have always tried to respect the laws as expounded by the courts, and if this feeling had been more general, North and South, these troubles could not have occurred.—EDS.

Filter for Soldiers.

MESSRS. EDITORS :—When we find, as we do, our own scientific publications alluding to the fratricidal contest now raging in America, we cannot feel any surprise that comments on that subject should occupy so large a space in your journal. In the SCIENTIFIC AMERICAN of the 11th inst., just to hand, we notice (in connection with this subject) a leader, headed "Purifying Water for Soldiers," and a paragraph under the title of "Inventions of War Wanted Immediately." Now, sir, the exact article called for has recently been invented here by a Mr. Dahlke, and after repeated trials, has been adopted not only by many private parties, including the Drinking Fountain Association, but even by our government, so celebrated for its red tape and slowness in adopting any novelty. Being struck with the perfect manner in which your call for a flexible india-rubber tube, fitted with a metallic mouthpiece with some substance like sponge, or what would be better, a composition of porous carbon, placed inside, at a point near the end, to be placed in water, &c., has been anticipated by Mr. Dahlke's invention of silicated carbon filters, the circumstance has been brought under his notice, and he has forwarded some samples for inspection to our New York agent, Mr. C. F. A. Hinrichs, No. 150 Broadway, where they may be seen and full particulars obtained.

Wishing you all well out of your present troubles, we are, sir, yours truly, MORGAN BROTHERS.

London, England, May 16, 1861.

The Big Gun.

MESSRS. EDITORS :—In your recent article on colossal cannon, mentioning the immense pieces at Ehrenbreitstein, &c., you do not give the Turks the credit, to which they are entitled, of having the *largest* ordnance in the world. The famous cannon used by Mohammed II. at the siege of Constantinople, which threw a stone ball weighing 600 pounds, I suppose, is not in existence; but there is one still larger at the Dardanelles, carrying a stone ball of 1,100 pounds, and requiring a charge of 300 pounds of powder. This is referred to in Gibbon's "Decline and Fall," Vol. 4, Cap. 68, p. 339.

Hoping that you will do our rather "slow" friends the Turks the justice to notice this fact in your valuable paper, I remain, M. S. B., Jr.

Monterey, Mass., May 28, 1861.

New Trades Suggested.

MESSRS. EDITORS :—As the war will throw many out of work, could not some article be made here that is now imported, or some new trades introduced? An examination of the new tariff would perhaps show a great many kinds of business new to this country, and by this means keep a great deal of money from leaving the country. With new trades will come new machinery. G. C.

Boston, Mass., May 28, 1861.

A Voice from a Border State.

In our last number we alluded to the increasing evidences of loyalty in Kentucky. If any of our friends in the South think we are their enemies because we oppose secession, or if any of our English and French readers think the North is aggressive and unjust to the South, let them read the testimony of gentlemen who are probably slaveholders themselves.

On the evening of the 22d of May, at a public meeting in Louisville, Hon. Robert Mallory and Judge Bullock addressed the meeting to the effect that there was no adequate, just or reasonable cause for the secession, rebellion or revolution of a single Southern State. The pretexts for secession were all silly, flimsy, groundless and absurd. The General government neither injured, nor interfered with, nor threatened Southern rights in any wise. The Fugitive Slave Law was as faithfully executed as any law upon the Federal or State statute books, and, with reference to Kentucky and Missouri, is better carried out today than ever before. Southern rights in the Territories were as well secured and respected by the laws of the second session of the last Congress as Northern rights. Southern rights in the Territories and in the States were never so perfectly guaranteed as they are at this day. The secessionists knew they could control the Administration in the ensuing Congress by a majority of twenty-two in the House and thirteen in the Senate, and yet seceded. Secession is the sum of all crimes, follies and absurdities. Kentucky will never sanction the conspiracy. She will never join "the Confederate States" in their insane and suicidal career—will never inflict infamy and ruin upon herself for their sakes. For Kentucky to secede would be pusillanimity, cowardice, treason. Let her, if need be, be the Thermopylæ of liberty and union. While she will strive for peace, compromise and re-union, she will not desert the Stars and Stripes. She will fight for her country's flag rather than give it up for the Palmetto or Confederate flag.

Judge Bullock, in this connection, said :—"Though every other Southern State secede, I would have Kentucky stand alone and stand firm. I would as soon think of deserting the grave of my father, or the flag of my country in the hour of battle, as of advising Kentucky to desert the Union at this crisis. I would rather fall dead this instant than do so. All the blood in my veins is Southern; all my relatives live in the South; I deeply sympathize with my deluded and misguided Southern brethren; but I would strike down as a traitor even my twin brother who should dare to trail the flag of the United States, the flag of my country, upon my native soil of Kentucky. And I brand him a liar who calls Kentucky a coward for sustaining, as she will, the government of the United States."

Mr. Mallory, referring to Governor Magoffin's "warning" the government not to occupy any fort, post or place in Kentucky, said :—"The government has clear constitutional rights upon our soil, and they must be respected and maintained. The government has in Kentucky its courts, its custom-houses, its post-offices, its arsenal, its barracks, its arms and munitions, its troops, its officers—military, judicial and civil; and the government has a perfect right to keep them here. The Confederate States have no such rights in Kentucky."

We have taken the same high national ground in the SCIENTIFIC AMERICAN—not as partisans—not as enemies of any one section, but as citizens of the United States, desiring equal and exact justice to all. We uphold the government as a Christian duty, without committing ourselves to the dogmas of any party. Secession we oppose; it is not a decent dogma, but a cheat and delusion, and, as General Jackson said, to admit it, is to admit that the United States is not a nation. Loyal men in Kentucky and elsewhere see this—they well know that the government of the Confederate States has no real stability—they know that South Carolina, or any other State in the Confederacy, though having formally accepted of the Constitution, is not bound to abide by it another day. The theory of secession and paramount State rights destroys at once a supreme Federal power, and renders such a Confederacy not only a rickety concern, but a by-word and a reproach among nations. We therefore believe under God that the best possible service we can render to our Sothern brethren is to oppose the doctrine of secession

The following is an extract from a letter received by us a few days ago, from a correspondent residing in Barron county, Ky.:—

I expect our correspondence will shortly cease as citizens of the same government and nation, from the distraction that is now prevailing over the land, though I see nothing to justify such an unreasonable and unlawful determinatron on the part of the Southern people.

I dabble in politics sometimes, as well as in mechanics. I am using what little influence I have to put down the Southern rebellion, for it is nothing else.

The people of Kentucky at this time are like a boiling caldron. I am satisfied that two-thirds of the people of this State are opposed to secession, if they were let alone.

But such efforts to seduce them and make them act falsely to themselves never were before used in a civilized country; all the devices that ingenuity can invent are resorted to—threats, force, distress, intimidation—all, everything that can be brought to bear, are rushed on the mind pitched up to the highest degree of excitement.

I sometimes make speeches for which I am threatened to be killed or hung; but I shall continue to speak and use what I have to the last.

I expect to lose my interests in the Southern States if Kentucky does not secede. But I would rather sacrifice them in all the States than give up the government of the United States. Yours, truly.

J. H. G.

Complimentary Encomiums from our Friends.

In presenting the annexed letters, we would state that now is an excellent time for inventors to apply for patents. The Patent Office is not over-crowded with work, and can, consequently, give each case coming before it for examination better and more prompt attention than in ordinary times.

The publishers of this paper continue to conduct applications for patents in this and foreign countries on favorable terms.

For full particulars send for a pamphlet called "Hints to Inventors," which is mailed from this office free on application. We also refer our readers to the advertisement headed "Change in the Patent Laws," on another page.

MESSRS. MUNN & CO.:—Our Letters Patent are at hand. We are under obligations to you for the manner in which you prosecuted our business before the Patent Office. We are also indebted to you for making claims on parts which we had overlooked. We promise you our patronage hereafter if we should invent any other device worth patenting. We should have acknowledged the receipt of our patent sooner, but have been absent on a visit to the Washoe Silver Mines, and are just returned. We are gratified that we have such an institution as your agency in the United States. W. C. SALMON.

GEO. F. BLISS.

Placerville, Cal., April 30, 1861.

MESSRS. MUNN & CO.:—The skill and dispatch which you have displayed as agents in taking out various patents for me during the past three years, in this country as well as European countries, will always be reverted to with pleasant recollections. Your facilities for preparing drawings and specifications, and obtaining patents, I feel confident cannot be equalled on either continent. Previous to employing you I had employed other patent agents, but where their charges have been exorbitant yours have been very moderate. Again, the SCIENTIFIC AMERICAN, as a medium for bringing scientific and mechanical improvements before an appreciating public, is certainly far in advance of any other journal or periodical published in this country; and as a work of reference for the man of science or laboring mechanic, I consider it superior to anything of the kind published in this country, and worth many times the cost of subscription to the possessor. It is a storehouse of knowledge—an index of all important scientific and mechanical improvements of the day. Believing that all who have had dealings with you have met with the same promptness and courtesy that I have experienced at your hands, I remain, very respectfully, yours, J. B. AIKEN.

Franklin, N. H., May, 1861.

MESSRS. MUNN & CO.:—I would take this opportunity to express my thanks to you for the skill with which you prepared the claims and obtained the Letters Patent for my button-hole cutter. I verily thought that, as I had invented the cutter, no one could possibly describe it or make the claims show precisely what I wanted to claim so well as myself, but I am glad that I did not attempt it, as I am satisfied I should have failed in several important particulars which you saw and guarded against. I must say that I had no idea of such clearness, combined with such precision and brevity, as was displayed in the claim drawn up by you. I think that if inventors generally knew your ability in this respect they would not attempt to procure their own patents. I. J. FEARING.

South Weymouth, Mass., May 31, 1861.

The invention referred to above was illustrated on page 368 of our present volume.

GIFFARD'S INJECTOR ON LOCOMOTIVES.—The Railway *Review* states that M. W. Baldwin & Co., of Philadelphia, have recently built a number of locomotives, each having a Giffard injector. In practice, the boiler being fed one day or one week, exclusively by the one instrument and then by the other, during the same length of time, no difference has been detected in the generation of steam. It has been reported that on some other boilers the steam pressure cannot be maintained with the injector.

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Improved Farm Gate.

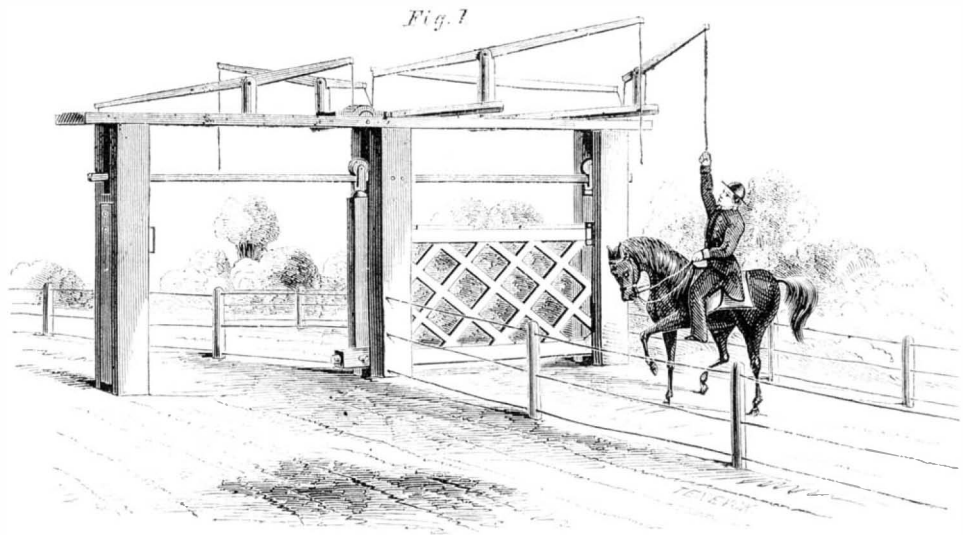
The convenience of having gates that may be opened by a person on horseback or in a carriage is felt by every one residing in a country seat, where the roads and drives must be frequently crossed by fences, and many plans have been devised for accomplishing the object; and, among the number, the one we are about to describe seems so us one of the best plans. The gate here illustrated is easily opened and closed, very certain in its operation, and not liable to sag or be blown down.

Fig. 1 is a perspective view, and Fig. 2, a section through the middle. The gate, A, is hung by rollers upon the two levers, *b b'*, these levers being pivoted to the middle post, C. The gate is opened by raising the outer end of the lever, *b*, through the medium of lever, *d*, and cord, *e*. As the gate rises, its bottom is forced back by a pin which works in the inclined slots, *f*, in the bottom of post, G, thus pressing back the spring, *h*; and when the pin reaches the top of the slot it is released, and the gate is started quickly forward by the action of the spring, *h*, the inclined position of the lever, *b*, also aiding the motion, and rolling the gate along upon the lever, *b'*, between the posts, C and I. When the gate reaches its new position, it is held in place by a spring latch, *j*, the free end of which works horizontally and catches hold of a staple, *k*. This staple is bent sideways, as shown in Fig. 3, so that when the gate is raised at the outer end, to close it, the latch may be released from its hold by being drawn above the staple. A similar latch and staple also hold the gate in its closed position. Precisely similar mechanism is used for closing the gate as for opening it.

The gate may be opened or closed by a person on foot, by pressing the latch, *j*, away from its hold upon the hook, *k*, and running it along upon the levers, *b* and *b'*, in their horizontal position.

The patent for this gate was granted through the Scientific American Patent Agency, Feb. 19, 1861, and further information in relation to it may be obtained by addressing the inventor, Hiram Barber, at Junean, Wis.

Fig. 1



BARBER'S IMPROVED FARM GATE.

Fig. 2

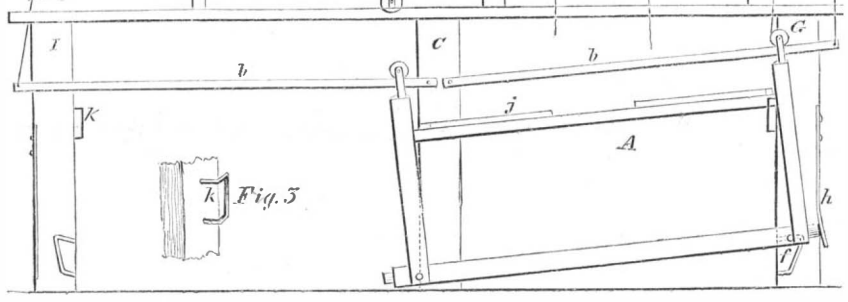


Fig. 3

The Minie Ball.

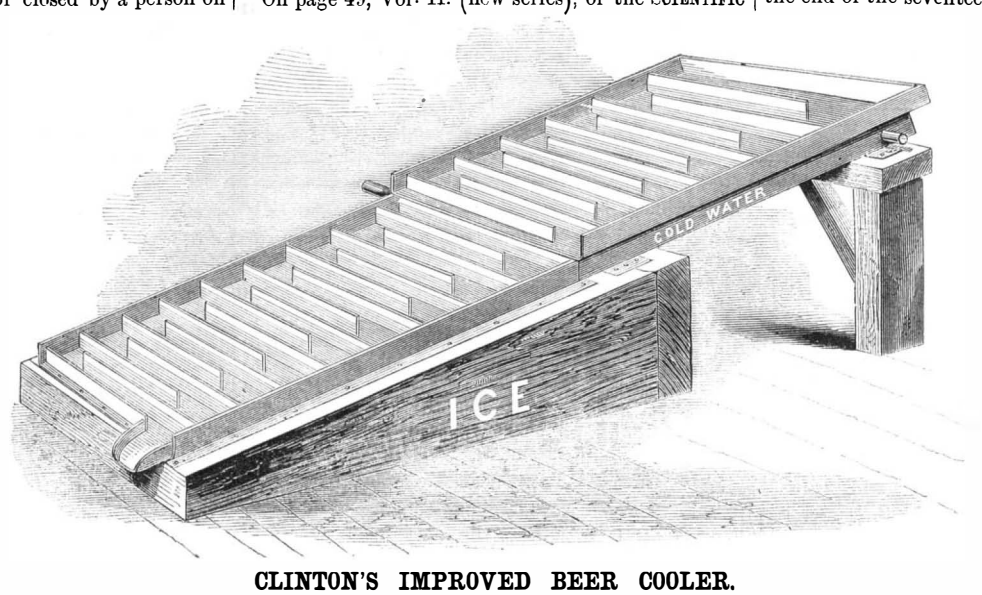
The destructive properties of the conical ball or slug, fired from Minié rifles, was made apparent at St. Louis, during the recent disturbances there. The *News* says that some of the slugs, in striking the walls, tore bricks for a space of three or four inches in diameter, and, when they struck perpendicularly, penetrated to the depth of six inches into the solid wall. One shot, fired at an angle to the wall, tore away a brick next the door frame, struck the edge of the frame, penetrating at least six inches, and went through the door, lodging into the opposite wall.

Improved Beer Cooler.

On page 49, Vol. II. (new series), of the Scientific American, we gave an account of the mode of manufacturing beer, with a statement of the conditions required in the process of cooling. These conditions are that the wort should be cooled as quickly as possible, and should, at the same time, be freely exposed to the air. The ordinary process is to spread the liquor in broad, shallow tanks, usually occupying the whole upper story of the brewery. Our engraving illustrates a compact apparatus for performing the operation more perfectly, invented by A. B. Clinton, of Cooperstown, in this State.

A shallow, inclined tank or trough is partially divided by partitions extending nearly across it, alternately joined to each side, as shown, and with their unattached ends inclined part way down the troug h, so as to form a zigzag channel running to-and-fro across the trough, from its upper to its lower end. The beer is let into the upper end of this channel and follows its devious track downward to the lower end; while, at the same time, a current of cold water is passing in the opposite direction upwards through a similar channel in the box below on which the trough rests.

In case the wort should not be sufficiently cooled, in the passage through the trough described, it is passed through another of similar construction, which, instead of resting upon a water channel, rests upon a box of ice, as shown in the engraving.



CLINTON'S IMPROVED BEER COOLER.

The advantages of this apparatus, in compactness and rapidity of operation, as contrasted with a broad tank as large as a whole house, are manifest.

The patent for this invention has been applied for through the Scientific American Patent Agency, and will be offered to the public in a few weeks. Further information in relation to the invention may be obtained by addressing the inventor, A. B. Clinton, at Cooperstown, N. Y.

New Lubricator.

At a late meeting of the Paris Academy of Sciences M. Mathieu, a maker of surgical instruments, presented a peculiar fat which he stated was obtained from india-rubber, purified at a high temperature. He said it was hygrometric, adhered to the polished surfaces of machinery, and was the best lubricating agent for journals, valves and hinges yet discovered. It preserves iron from rusting, and, when applied to leather, it renders it water-tight and pliable. If this substance really possesses such qualities it is certainly one of the most useful discoveries of the age.

Chinese Breech-Loading Cannon.

In the Taku forts, at the mouth of the Peiho river, taken by the British and French forces in the recent Chinese war, there were found a lot of cast-off Chinese guns, evidently very old, and said to have been rejected about the end of the seventeenth century, nearly two hundred years ago, when the famous Ferdinand Verbrist taught the natives to manufacture cast guns of iron and brass. Some of them were made of brass, of wrought iron, bound with rings of the same metal, all welded together, others of two scries of rings one outside the other, and some had an external shell of cast iron; but the most curious of all was a regular breech-loader, very like Sir W. Armstrong's, having a lateral opening into the bore, and having a similar breech with a longitudinal bore, instead of a screw, to keep the breech up to its place. There were no trunnions upon this piece. Two guns were in some cases mounted on the same carriage, making a double-barreled piece, probably for firing chain shot. These latter resemble what is a comparatively new invention in this country.

A lighthouse erected on the Scottish coast has cost four hundred thousand dollars.

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Scientific American

MUNN & COMPANY, Editors and Proprietors.

PUBLISHED WEEKLY
At No. 37 Park-row (Park Building), New York.

O. D. MUNN, S. H. WALES, A. E. BEACH.

TERMS—Two Dollars per annum.—One Dollar in advance, and the remainder in six months.

Single copies of the paper are on sale at the office of publication, and at all the periodical stores in the United States and Canada.

Sampson Low, Son & Co., the American Booksellers, No. 47 Ludgate Hill, London, England, are the British Agents to receive subscriptions for the SCIENTIFIC AMERICAN.

☞ See Prospectus on last page. No traveling agents employed.

VOL. IV. NO 24.....[NEW SERIES.]....*Seventeenth Year.*

NEW YORK, SATURDAY, JUNE 15, 1861.

SIX GOOD REASONS WHY EVERY MANUFACTURER, MECHANIC, INVENTOR AND ARTIZAN SHOULD BECOME A PATRON OF THE "SCIENTIFIC AMERICAN."

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V. In subscribing for the SCIENTIFIC AMERICAN, the reader receives the latest foreign as well as home intelligence on all subjects pertaining to the industrial pursuits of the world. All the best scientific or mechanical periodicals published in England, France or Germany are received at this office, affording us facilities for presenting to our readers the very latest news relating to science or mechanics in the old world.

VI. Subscribers who preserve their numbers have, at the end of the year, two handsome volumes of 416 pages each, containing several hundred engravings, worth, as a work of reference, many times the price of subscription.

CONFUSION AT THE PATENT OFFICE.

THE clerical force at the Patent Office seems to be in a most confused state; and while the Commissioner and the Examiners seem to be trying to do their duty, the mailing department of the office seems to be managed in a very indifferent manner. For the credit of the Patent Office and the convenience of persons having business with the department, we ask the Commissioner, in behalf of the inventors throughout our country, to have the following abuses which have recently crept into the office, corrected.

Formerly, all patents issued during a week were mailed on Tuesday, and bore date corresponding with the time they were sent from the office. Latterly, we are receiving patents scattering along every day in the week—instead of the whole weekly issue by one mail—and we presume other attorneys suffer the same inconvenience. The lists of claims are very irregular in reaching us, sometimes coming on Monday, sometimes on Wednesday, and sometimes not at all, and then again two week's issue reach us by the same mail. And, again, we are continually having letters from the Office alleging that a specification or drawing accompanies the letter, which is not enclosed; and as often we receive specifications and drawings without any letter to indicate for what purpose they are returned, in both of which cases we are obliged to write to the department for explanation, which consumes time, causes unnecessary delay in the issue of the patent, besides rendering unnecessary trouble to the attorney. We are also in constant receipt of letters from the Patent Office designed for other persons. We call to mind six such letters which have come to us this week. There is nothing like system in every department of business; and while we were willing to bear the inconvenience of some irregularities in the Patent Office while the troops were quartered there, and while the department was experimenting with the printing of the specifications, now the soldiers having left, and adequate time for systematizing the printing department has elapsed, we call upon the Commissioner to martial his forces, and see that every man does his duty.

INSPECTORS OF SUPPLIES.

There are no duties connected with the prosecution of the war requiring higher moral and business qualities than the inspection of the various articles of arms, equipments, and supplies. The officers of the regular army, who are educated at West Point, are perfectly trained to the performance of this duty, as they are to all the duties pertaining to their profession. Nothing can exceed the thoroughness with which swords, bayonets, muskets, &c., are tested at our national armories before they are passed to the soldiers for use. The swords are bent point and handle together, they are whipped over a log, and tried in every possible manner by the severest tests. Weights are suspended upon the bayonets, their points are struck into the floor and pried with, in a way to certainly break them unless they are made of the very best metal and of the truest temper. The muskets are fired with enormous proof charges, and, in short, every article entering into the service of the army is subjected to the most rigid and minute examination.

It requires very little experience to demonstrate the importance of this thorough inspection, and if the government cannot detail a sufficient number of officers from the regular army to perform the service, could not the commanders of our volunteer regiments be instructed in this most essential duty? We have no doubt that a very large proportion of our business men who are offering contracts to the government would scorn to palm off worthless articles upon the brave defenders of the nation, but the community is swarming with adventurers from all nations whose only aim in coming here was to make as much money as possible in the shortest time, and it is possible that there are even American-born citizens who would be guilty of the immeasurable baseness of trifling with the comfort, health and lives of our soldiers for the sake of gain. We hear of numerous efforts being made to either palm off worthless rubbish upon the army, or to obtain double pay from the nation in this hour of need for articles which will serve their purpose. For instance, an officer tells us that the knapsacks for his regiment were contracted for by a sample which was stitched together in the firmest manner and well made in every respect, while those actually furnished were merely pasted together and soon came to pieces. The officer said that he expected to be sued for the pay for these knapsacks by the scoundrel who made them! We hope that the law may take the opposite course, and that the villain may be arrested and sent to the State prison for the remainder of his days. In some cases respectable shoe-dealers have been approached with an offer of a contract, if the merchant would make his bills for nearly double the price usually charged wholesale dealers.

Under the able administration of Secretary Cameron, we presume that these disorders will soon be corrected, and to aid in the reform, we would suggest that Congress should pass, among the few acts of its extra session, a law providing that every dishonest contractor and conniving inspector should be subject to trial by a drum-head court martial and instant military execution.

DEATH OF SENATOR DOUGLAS.

The Hon. Stephen A. Douglas, United States Senator from the State of Illinois, died at nine o'clock on the morning of June 3d, in the city of Chicago, after an illness of several days.

No other public man in this country has filled so large a page in its history or stood so prominently before the people's gaze for the last ten years as did Mr. Douglas.

He was born in the town of Brandon, Vt., on April 23, 1813, and was therefore, at the time of his death, in the forty-eighth year of his age. His history is one of striking interest, and to undertake to recite it in detail would require volumes.

His father was a physician of eminence, but died young, leaving two children, one of whom—the late Senator—was then but two months old. He served an apprenticeship at cabinet making, and worked at this trade for a couple of years. He seemed determined to have an education, and on the removal of his mother to Ontario county, this State, he entered the Canandaigua Academy, and studied law in that beautiful town.

He began life a poor boy, and by the force of his own will, worked his way along from the cabinet maker's bench to the desk of the school house, to the bar, to the Attorney-Generalship of Illinois at the age of only twenty-two years, to the Land Office, to the State Legislature, to the State Judgeship of the Supreme Court, to the House of Representatives, to the Senate of the United States, which latter position he has held successively for fourteen years.

Mr. Douglas was a candidate for the Presidency at the last election, and received the next highest number of votes of the four candidates. He was an able and powerful debater, moving into the arena like a gladiator; and as a stump orator, probably he had not an equal in the country. The last public act of his life was his address to the Illinois Legislature, urging upon them to sustain the government, and avenge the insults to our country's flag. The speech in question is a model of perspicuous eloquence.

He was a generous-hearted man, and had his faults; but his death covers them all, and he will be mourned as a patriot and friend of his country. The Secretary of War, General Cameron, published a marked tribute to the memory of the dead Senator, and ordered it to be read to all the regiments, and that the national colors be draped in mourning.

ABSURDITY OF STEAM AND CENTRIFUGAL GUNS.

The public mind has been somewhat exercised respecting the steam gun which was captured on its trip from Baltimore to Harper's Ferry, but nothing can be more absurd than the attempts which have been made to apply steam directly and indirectly in projecting bullets—large and small—for purposes of warfare. To project 32-pound balls by centrifugal mechanism, a steam engine of no less than 60-horse power is necessary. With a cannon, we can obtain the same result with eight pounds of gunpowder for every shot. For discharging bullets by steam power, a furnace, a boiler, steam engine and centrifugal machine are required; with gunpowder, the cannon answers for furnace, boiler, engine and projecting machine. How complicated the mechanism by the former method—how simple the latter.

The principles of science lead us to pronounce emphatically against steam when compared with gunpowder, as an expansive agent for projecting shot. The ignition and expansion of gunpowder is almost instantaneous, and it is applied directly to project the missile. The heat of burning fuel used in generating steam is really the primary force in the boiler, just as the heat of the ignited gunpowder is in the cannon. The difference between the instantaneous combustion of the powder and the slow combustion of the coal will convince any person how superior the former is to the latter as a force for projecting missiles of war. The powder is more expensive than coal, but it is no more expensive than it is superlatively effective.

Jacob Perkins (our countryman, residing in London), obtained a patent May 15, 1824. The shell was filled partially with water, and was closed at the rear end with a fusible metal plug. It was placed in a highly heated furnace, and so arranged in connection with a discharging tube that, when it attained to a very high temperature, the plug melted, the steam then

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flashed out, and, by its reaction, threw the shell out of the tube. It was an attempt to use steam as a substitute for gunpowder in shells, and was a failure. The centrifugal gun of Robert McCarty, of this city, which has been tried two or three times recently at the foot of Thirty third street, North river, was patented as far back as December 31, 1838. It is essentially composed of a hollow revolving wheel, which discharges its balls through a tube at the periphery by centrifugal action. By applying a steam engine to drive the wheel of this gun, instead of two men working cranks, we really have the Baltimore gun in its most essential features.

On the 21st of December, 1854, A. Smith, D. McKenzie and James Thompson, of England, took out a patent for discharging bullets from a gun by using very high pressure steam as a substitute for powder. The steam was contained in a very strong, small boiler, and was admitted and cut off by a valve to discharge the shot in the same manner that steam is admitted behind a piston in an engine. The boiler was surrounded by a bath of molten metal heated to 1,100° Fah. This was a true, but a very foolish steam gun.

An anecdote is told of the Duke of Wellington to the effect that, after having examined Perkins' steam gun with great attention, and having asked a number of pertinent questions relating to its weight, the means of moving it, getting up steam, &c., he dryly observed, "Well, if steam guns had been invented first what a capital improvement gunpowder would have been." We do not consider that the Duke of Wellington's opinions were infallible respecting inventions, or that he was a man of what may be called "brilliant intellect," but he had a vast fund of plain common sense, and the multitudinous appendages of the steam gun convinced him that it was unfit for the purposes of war. A steam gun could throw a stream of bullets upon the advancing head of a storming column, but with four guns in battery a perfect stream of canister may also be thrown upon an attacking party and produce more destructive results.

BATTERY OF WHITWORTH CANNON ARRIVED.

A number of loyal American citizens in England have made a present to the government of a battery consisting of four of the celebrated Whitworth wrought-iron rifled 12-pounders. One of these was exhibited to the public on the 3d ult., in front of the City Hall, where it attracted a large crowd of spectators, ourselves, among the number, who examined it. This gun is a breech-loader, and its bore is rifled, with hexagonal grooves, having a turn in thirty-six inches. The length of the gun is 9 feet; the bore $3\frac{1}{5}$th of an inch in diameter; the bullet used is of cast iron, $9\frac{1}{2}$ inches long, and in form is an elongated oval. At the middle or thickest part it is formed with long ridges to fit the grooves of the gun and prevent windage. The metal of this cannon is thin, but strong; and the workmanship appears to be good. This was to be expected, as the inventor is the most distinguished tool-maker in Europe, and he was the Commissioner on Machinery appointed by the British government to the World's Fair at New York, in 1853.

The breech of this rifled cannon is a steel screw cap—it has no wedge-plug like the Armstrong gun. A lever, like that of a vise, is attached to the outside of the breech, and three turns unscrew it. A hoop supports the cap, and it is swung back a little to the one side, like a door, leaving the breech open to receive the winged shot and cartridge. A tin spiral cartridge case receives the charge of powder inclosed in a wad lubricated with a composition of wax and tallow. The breech is now swung forward, screwed on, a friction fuse placed in the vent-hole, and it is ready for firing. The loading can be executed rapidly, and the tin cartridge case prevents all leakage at the breech. This case is not discharged, but remains in the breech-chamber, and is drawn out when a new charge is to be put in.

It has been stated that the Whitworth cannon has surpassed that of the Armstrong gun in range and accuracy. Two 3-pounders and one 12-pounder, similar to the one on exhibition, were tried on the sea beach near Liverpool in the spring of 1860, when the small guns threw shot $5\frac{1}{2}$ miles with an elevation of 7°, and the 12-pounders at an elevation of 5° had a range of 2,754 yards, with a charge of $1\frac{1}{2}$ lbs. of powder. With this range, the average distance of ten shots from the center of the target was one yard. The range at 7° elevation was over five miles. We think these guns will carry accurately at long ranges, because great care appears to have been bestowed upon the bore, grooves and muzzle.

Accurate shooting cannot be executed with a foul gun; it must be kept perfectly clean in the inside or it will not give satisfaction. It has been stated that one of these guns has sent a shot through a $4\frac{1}{2}$-inch plate of iron. By using lead bands on the elongated shot they do not require to be cast with wings.

The *Army and Navy Gazette* of England says that notice has been received at Portsmouth that a 200-pounder Armstrong gun will soon be sent there for experiments against iron plates, and application has been made for new 4-inch and 5-inch plates for the sides of the *Sirius*. The Iron Plate Committee, of which Lieutenant-Colonel Henderson, R.A., is president, have been carrying on experiments on penetration at Shoeburyness. It may be interesting to know that, in the late visit of the Duke of Cambridge to Shoeburyness the Whitworth and Armstrong field pieces were matched for time against each other, when the former fired 20 rounds in 20 minutes 16 seconds, and the latter did the same in 15 minutes 7 seconds. The practice was at 1,000 yards' range, and was of first-rate quality from both guns; but the Armstrong, in the form of the breech and the manner of closing up, would appear to have an undoubted advantage. A 300-pounder gun, on the Armstrong principle, is in course of manufacture.

HIGH PRESSURE STEAM IN CONDENSING ENGINES.

The London *Engineer* publishes some extraordinary information on this subject. It states that Mr. L. Perkins, of London, has for several months past been working an engine at pressures of 350 lbs. on the square inch, expanding it down twelvefold, and then condensing it. The engine used has three single acting cylinders, the piston rods of which are connected to a single cross-head. The first cylinder in which the steam is admitted receives it at a pressure varying from 250 lbs. up to 600 lbs. per square inch. The cylinder is 6 inches bore, the metal $1\frac{1}{2}$ inches thick. From this cylinder the steam, which is partially expanded, is exhausted into a 14-inch cylinder, and from this into the third cylinder of the same size. The steam acts upon the lower side of the small piston, also upon the same side of the second one, but upon the upper side of the third piston. The exhaust steam is conducted into a surface condenser at a pressure varying from 10 to 20 lbs. The total indicated power of this engine is 60-horse power, with a consumption of only 70 lbs. of coal per hour.

Mr. Perkins is the son of Jacob Perkins, the distinguished American inventor who first experimented with steam guns, and used steam at a pressure of 1,000 lbs. There can be no question about the economy in fuel resulting from high pressure steam expanded several times, when the cylinder is well protected, and the steam slightly superheated, but very high pressure boilers are dangerous. We scarcely ever hear of the explosion of a low pressure boiler, but explosions of high pressure boilers are too common. Safety first, and saving of fuel second, should be the rule in steam engineering.

Contractors Look Out.—The evil of selling out contracts to third parties at a large bonus, is quite seriously felt, but the Assistant Commissary General, Col. Welch, is determined to put a stop to this as far as possible, and, with the aid of Inspector Rich, is succeeding quite fairly. A day or two ago 750 axes were brought to the Arsenal, in this city, by a subcontractor, which did not contain a particle of steel. Col Welch immediately rejected them, and purchased others at the expense of the contractor, who, by this operation, will be several hundred dollars out of pocket. A man who would thus be guilty of defrauding the government in times like these, would rob a hen roost. Let the honest indignation of the people frown upon such scamps. They almost deserve a coat of tar and feathers, but our people are not accustomed to this enlightened practice.

Sharp's Rifles.—The Hartford (Conn.) *Courant* states that the manufactory of Sharp's rifles in that place is to supply government orders.

WOODEN-SOLED SHOES FOR SOLDIERS.

A well managed commissariat is to an army what a good boiler is to a steam engine. An army may be large, well disciplined and brave; but it will prove very inefficient, and will ultimately become disorganized, if the men are not properly fed and clothed. Perhaps no department of the commissariat receives such improper attention as that which relates to furnishing the soldiers with shoes. We learn from our Philadelphia cotemporaries that gross frauds have been perpetrated upon volunteers in Pennsylvania, in the wretched shoes which have been provided, and loud have been the complaints against them. It is a false economy to purchase cheap and poor shoes for an army; they should be made in the best manner and of the best materials. But it is a question of great importance to ascertain what kind of shoes are the best for an army. For quick movements and rapid marching, shoes made with strong leather uppers and thick hemlock-tanned soles are, perhaps, the best, all things considered. But every soldier should have two pairs of shoes, and for various duties the wooden soled shoes manufactured by McClallan & Son, of Chicopee, Mass., are the most suitable which can be provided, as one of the two pairs.

We stated on page 10 of the present volume of the Scientific American, that numbers of the French soldiers, when in the Crimea, wore wooden shoes during winter, and they suffered less from sickness than those who wore shoes of leather. The reason of this is evident, and it should afford a lesson to all military authorities. The wooden sole is an excellent nonconductor, therefore such shoes keep the feet dry and warm in wet weather, or when the soldiers are working in the trenches, or when exposed upon guard during damp weather. It is well known that when the feet are kept warm, the body partakes of the same comfort, and *vice versa*. The condition of the soldier's feet has a most important influence upon the health of an army, as by keeping them dry and comfortable, chills and fever, and dysentery—the common attendants of camp and field life—are to a considerable extent prevented. These reasons principally induce us to recommend the improved wooden soled shoes for soldiers in our army.

Another reason has also weight with us in this recommendation. These shoes are cheaper and more durable than most of the leather shoes that are manufactured, and they are therefore more economical for soldiers. And beside this, as they are made under the authority of one company, every shoe furnished can be traced to a responsible source, and this will always insure a supply of good articles. These shoes also possess the advantage of being very easily mended by any soldier. If the outer sole is worn down, piece of leather can be put on in a few seconds with four screws, then filled with tacks.

Our Soldiers.—It pleases many secession journals to employ language toward our soldiers of the vilest character. Now, if this sort of warfare could gain a single victory or confer the slightest possible advantage upon the armies of the Confederate States, there might be some excuse for it as a species of low tactics; but all the Billinsgate of the secession press will not degrade the character of the Federal troops. They will be just as brave and just as determined to win the victory as ever, and if Southern troops expect to see them take to their heels and run at the first sight of a secession host, they will commit a blunder. No American need feel ashamed of the soldiers of the Union. So far as we have watched their departure for the seat of war, we are prepared to say that a nobler set of men never rallied to the support of a government.

Col. Fremont, whose name is so well known throughout the world, has received the appointment of Major-General in the army of the United States, and is expected to return home from Europe at once and will bring with him ten thousand rifles and a park of rifled artillery, consisting of forty 12-pound guns.

A very curious pleasure boat, built for the French Emperor, now lies at Asniers—a complete imitation of the *triremes* of the Roman period. It is about 80 feet long, with three ranges of oars, one above the other; its high prow and stern give it a very picturesque appearance.

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Secession in Tennessee.

It seems as though the truth could not serve the purposes of the secessionists. They are a shrewd and unscrupulous set, and have thus far worked out their diabolical schemes in a bluff and reckless manner, and have hoodwinked seemingly good men into their snares. One of the most lamentable examples is now before us in the address issued to the people of Tennessee by the editors of the secular and religious press of Nashville. It was written undoubtedly by a secession editor, and abounds in all those flimsy tales of imaginary wrongs which have made up the whole stock in trade of these conspirators against the government, and no doubt religious editors have been either gulled or frightened into their support, for we can hardly believe that a professed religious teacher could be guilty of such monstrous misrepresentations. We have no room to publish the entire address, but a single extract will show the web and woof of the whole fabrication. These Christian editors say:—"Powerful armies of fanatics and plunderers are to be quartered in our quiet cities and towns in the South, dictating laws to us at the point of the bayonet, and the slaves are to be turned loose with more than savage atrocity on helpless women and children."

If there be one editor at the North, be he political, scientific or religious, who is afraid to denounce this infamous system of deception upon a brave people, such as the State of Tennessee contains, he is a fit subject to privateer under Jeff. Davis' piratical letters of marque. The whole conduct of the government thus far is a refutation of the address of these pious editors at Nashville, and if they will but turn and read Major-General McClellan's address to the people of Western Virginia, on another page, and not blush for their treacherous conduct to the people of Tennessee, then we shall regard their case as hopeless. The war of the Revolution, which gave us our liberty, was not waged by such unholy weapons as are forged by the Confederates. Washington succeeded by no such ignoble supporters.

The Weapons of this War.

The editor of *Wilkes'* (N. Y.) *Spirit of the Times* is a soldier, and now in Washington. In a late letter to his paper, he thus remarks on the weapons with which the battles are likely to be won:—

Some importance has been attributed to the fact that the Southern men, as a general thing, are better marksmen than the soldiers of the North, and that they will consequently possess a great advantage, through such superiority, in the hour of battle. But while I do not believe that this is the case to any great extent, I would not, even if it were so, give much consideration to the fact; for in battle but few special shots are made, and the coming struggle is not destined to be a contest of mere markmanship or evolution.

War began with the spear for its weapon; after a variety of changes, through several centuries, it yielded its refinements, and under Napoleon III., on the fields of Magenta and Solferino, came back to the spear again. On those bloody and bitterly-contested fields, the alert Zouaves and the athletic Chasseurs d'Afrique refused to accept the rations of powder and ball when served out to the troops just previous to battle; nay, when the charge was given, even refused to discharge the loads which were already in their weapons, but, rushing forward through the fire, they engaged the Austrians hand to hand, and bayoneted them in the ranks. This is unquestionably the true resource of superior physical condition.

On this plan the coming war between the North and South will surely be contested; and in part evidence thereof, I merely point to the fact that the government has already taken away the little costly breech-loading toys which the munificence of New York put in the hands of Colonel Ellsworth's regiment, and served out to them the spear, in the shape of a saber on the end of a Minié musket, and may Heaven help those under the edge of whose bayonets these "pet lambs" shall succeed in getting.

The saber bayonet is also to be distributed throughout the entire army, and I feel certain, from what I have gathered through military men, that the actual embrace of battle, man to man, is what the Northern captains of this war intend mostly to rely upon.

FELT CLOTH.—A peculiar mode of making a kind of felt of cloth, is that by the pneumatic process, without spinning, weaving, or any analogous machinery. Into an air-tight chamber is put a quantity of flocculent particles of wool, which, by a kind of winnowing wheel, are kept floating equally. On one side of the chamber is a network or gauze of metal, communicating with another chamber from which the air can be abstracted by an exhausting syringe, or air pump, and on the communications between the chambers being opened, the air rushes with great force to supply the partial vacuum in the exhausted chambers, carrying the flocculent particles against the netting, and so interlacing the fibers, that a cloth of beautiful fabric and close texture is instantaneously made.

Important Invention.---Dressing Yarns for Weaving.

All cotton and linen yarn requires to be sized in the warp as a preparation for weaving in the loom. In dressing the warp of fine muslins a little grease is also applied, to render the threads soft and to preserve them in a slightly damp condition. It is scarcely possible to weave fine goods in a dry atmosphere, because the threads are so liable to break. All hand loom weavers of fine muslins have damp unhealthy shops, with earthen floors; and it has been asserted that the dry atmosphere of America prevents our manufacturers from spinning and weaving such fine yarns as the English manufacturers. We have always entertained the opinion that art could supply what nature had denied, in making an artificial damp atmosphere with steam; but a French inventor—Frederick A. Fresspel, of Paris—has resolved the difficulty in another manner. He has lately taken out a patent for making sizing with *glycerine*, glue and starch, as follows: He takes 100 kilogrammes of glycerine, heated to 24° Baume, 1 kilogramme carbonate of soda, 1 kilogramme of glue, 10 grammes of borax, and an equal weight of alum. These are all mixed together—being dissolved in the glycerine with sufficient water for the purpose. [A kilogramme is 2 lbs. 3 ozs. 5 drachms; a gramme is 15.4440 grains.] To the above a boiled solution of starch is added, until the whole is sufficiently thick for sizing the yarn. The glycerine is a hygrometric fluid, and the patentee states that this size preserves the yarn in a moist condition, and permits weaving to be conducted in the driest places.

STREET RAILWAYS.—In the Commons a bill for enabling people to make railways in the streets came on for second reading. This is the plan of Mr. Train, an American gentleman, who has actually got two such railways at work in London, and who, if he never does anything else, deserves the gratitude of the English lady for shaming the proprietors of the dirty, inconvenient nuisance called the British Omnibus, by producing a vehicle into which a woman can step decently, and sit in cleanliness and comfort. Also for substituting neatly uniformed and civil men for the coarse cads who at present bawl behind the buss. However, the question of giving the powers required by this bill is a distinct one from that of the advantage of the Train vehicles, and the bill was negatived after—perhaps because of—a smart speech in its favor from Mr. Bright.—*Punch's Essence of Parliament.*

A NEW APPLICATION OF PHOTOGRAPHY.—A circumstance recently occurred showing the great business utility of the modern discoveries of photography and the electric telegraph. The Count de Penafiel left Lisbon for Paris, carrying with him an order for 70,000 francs. This, however, he unfortunately lost on the road, and telegraphed the same to his banker at Lisbon. That gentleman at once telegraphed to Paris, stopping payment of the order, but sent by post the portrait of the Count de Penafiel, stating that the amount might be paid to him when he presented himself.

TESTING A LENS FOR SPHERICAL ABERRATION.—Point the camera at a very small bright object, such as the image of the sun reflected from a convex glass surface, and get it into proper focus. Now move the lens to and fro, in order to throw the visual image on the ground glass alternately within and without the focus; the bright point will expand into a luminous disk, and if it shows a firmer margin within than at an equal distance without the focus, it is under corrected for spherical aberration and slightly over corrected for color, as all photographic lenses should be. If any color be visible, it should be merely a slight fringe of blue within the focus or red without.—*Journal of Photography.*

IN a recent discussion in the Institution of Naval Architects in London, John Scott Russell alluded to R. L. Stevens, of New York, as the father of the system of iron-plated war vessels, and quoted his experiments to show that 6-inch iron plate would keep out 68-pounders altogether. Sir Howard Douglas, the great authority on naval gunnery, who has vigorously condemned the new iron-cased war vessels, now admits their necessity, but says that the iron plates must be put upon a wooden, and not an iron hull.

How they Make Cod Liver Oil.

A tourist in Newfoundland thus describes a visit to a cod liver oil factory at Petty Harbor, near St. Johns:—

The process of making this article is quite simple. The livers, fresh from the fish, and nearly white, are cleanly washed, and thrown into a cauldron heated by steam instead of fire, where they gradually dissolve into oil, which is dipped out hot and strained, first through conical felt bags, and then through those made of white moleskin, from which it runs pure and sweet as table oil. Wine glasses were at hand, from which we tasted it, and found it entirely agreeable. In this state it is barreled for market, and sold at an average price of one dollar and fifty cents per gallon. By what process it is transmuted into that horrid stuff which is sold at a high price, in small bottles, perhaps the druggist can inform us. When I mentioned the character of cod liver oil in New York, a gentleman present, qualified to decide, did not hesitate to say that it was adulterated with some cheap, base oil. Near by a fish house, there is ordinarily seen a row of hogsheads open to the sun, and breathing smells that none but a fisherman can abide. A near approach discovers these casks to be filled with cod livers in a state of fermentation. After a few days in the sun, these corpulent and sweaty vessels yield a rancid, nauseous fluid, of a nut brown hue, at a much less cost than the refined oil of the manufactory, and which, I imagine, must have a flavor not unlike that which the invalid finds lurking in those genteel flasks on the apothecary's shelves. After all, our common whale oil, I suspect, after some cleansing and bleaching, and slight seasoning with the pure, is bad enough for sick people.

A Whale Seized.

This is a day of seizures, and Boston has had a hand in bagging some big game. The proprietors of the aquarial gardens have fairly outdone Barnum, and now invite the Bostonians to come and see a live whale, which was safely introduced into his tank on Friday. We copy the following particulars from the *Atlas*:—

The present whale was caught in the St. Lawrence river, Upper Canada, between the Orelle and DuLoup rivers. His capture was secured by weirs, a sort of trap made of wooden stakes, inclosing an area of several miles of water, but so shaped as to concenter to a point, where big fish are nabbed. These weirs are set regularly each year for the whales, at a time when they make their annual visit to the locality in question. Fourteen have been caught within two months, which period is commonly accounted a season. Having been secured the one spoken of was placed in a huge box for transportation.

Before this was accomplished, however, the whale gave its captors very much trouble by his powerful flappings, &c., &c., having floundered some Frenchmen several times, much to their peril and inconvenience. The box was lined with seaweed, and was partially covered at the top with slats. The precious freight was then carried seven miles over one of the roughest roads in Canada; and from thence by rail 500 miles to Boston, by special trains, at an expense of some $700. The whole enterprise did not cost less than from $1,000 to $1,200. The whale is twelve feet long and weighs two tuns. His transportation was attended by many interesting events. At each station the monster was well watered as if he had been a locomotive. The aqueous attentions were quite necessary during the journey of sixty hours. All along the route the distinguished traveler was the object of great curiosity and the most animated conversation.

The whale is fed on fish. It eats a peck of herrings at a meal, though not on the whole a great eater, his size considered. Its diet when in its natural waters is chiefly a fish called the capelan.

Zinc and Steam.

The Paris correspondent of the London *Photographic News* says, upon this subject:—

The employment of electricity as a motive power depends on its relative economy with steam, or the difference between the cost of zinc and coal; for in the electric battery it is the zinc that is consumed, and is at present the most economical combustible for the purpose. Yet it is 105 times dearer than coal. Then to the cost of the zinc must be added that of the acids, making, for the same equivalent of power, zinc 200 times more costly than that of coal; or, rather, the cost of electromotive power is so much dearer than that of steam power. But a remarkable feature in the question is that, while ordinary steam engines redner only 0.052 of chemical power, the electromotive machine yields 0.20 to 0.25, which is enormous, and gives it an undoubted superiority over steam. Yet, even at this rate, electromotive power is twenty times dearer than that of steam. The question to be solved, therefore, is the economic production of electricity.

THE SURRENDERED GENERAL.—After the capture of Lord Cornwallis at Yorktown, he was one day standing in the presence of General Washington with his head uncovered. The General politely said to him: "My Lord, you had better be covered from the cold." His lordship, applying his hand to his head, replied: "It matters little, sir, what becomes of this head now."

PRIVATEERING.—The London *Volunteer Gazette*, which is said to be edited by W. H. Russell, special correspondent of the London *Times*, now in the South, denounces Southern privateering in the most unmeasured terms, such as: "The scum of the scoundralism of the world;" "We most heartily wish every one of them a short shrift, a strong cord, and a jump from the yard arm of the nearest man of war;" "We therefore owe it to the United States to put down, with a high hand, any privateering against them."

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THE NEW MAJOR-GENERALS.

Sketches of the Career of Generals McClellan, Butler Banks, Fremont, and of Brigadier-General Lyon.

There is a very natural anxiety to know all about the antecedents of those who are to be the leaders of the Grand Army of the United States in the pending contest, and below we give brief sketches of the Generals recently appointed :—

MAJOR-GENERAL GEORGE B. M'CLELLAN.

Next in rank to Lieutenant-General Scott stands Major-General George B. McClellan. He is hardly thirty-five years of age, having been born in Philadelphia on December 3, 1826. At the age of sixteen he entered the Military Academy at West Point, graduating with the class of 1846, with the rank of Brevet Second Lieutenant of Engineers. Until the Mexican war, however, he had no opportunity of distinguishing himself, and then, "for gallant and meritorious conduct in the battles of Contreras and Cherubusco," as the orders expressed it, he was breveted First Lieutenant. "For gallant and meritorious conduct in the battle of Molino del Rey," on September 8, 1847, he was offered a Brevet Captaincy, which he declined. He was advanced to this rank, however, subsequently, "for gallant and meritorious conduct in the battle of Chapultepec," and received the command of a company of Sappers, Miners and Pontoneers in May, 1848. At the close of the Mexican war he returned to West Point, where he remained on duty with the sappers and miners until 1851. During this time he introduced the bayonet exercise into the army, and translated and adapted a manual which has since become a text-book for the service. During the Summer and Fall of 1851 he superintended the construction of Fort Delaware, and in the succeeding Spring he was assigned to duty under Major R. B. Marcy, in the expedition for the exploration of the Red river. Thence he was ordered direct to Texas as Senior Engineer on the staff of General Persifer F. Smith, and was engaged for some months in surveying the rivers and harbors of that State. In 1853 he was ordered to the Pacific coast in command of the western division of the survey of the North Pacific Railroad route. He returned to the East in 1854, on duty connected with the Pacific survey, and was engaged also in secret service to the West Indies. The next year he received a commission in the First Regiment of Cavalry, and was appointed a member of the commission which went to the seat of war in the Crimea and in Northern Russia. Colonel Richard Delafield, one of his colleagues, is now an officer in the rebel army, and Major Alfred Mordecai, the third member of the commission, a short time ago resigned the Superintendency of the Troy Arsenal. Major McClellan's report on the "Organization of European Armies and the Operations of the War," a quarto volume, embodying the result of his obsevations in the Crimea, greatly enhanced his reputation as a scientific soldier.

In January, 1857, weary of inaction, he resigned his position in the army to become Vice-President and Engineer of the Illinois Central Railroad, which post he held for three years, when he was offered and accepted the Presidency of the Ohio and Mississippi Railroad, of which he was also General Superintendent. When our domestic trouble assumed formidable dimension, Major McClellan's services were at once called into requisition. Governor Curtin, of Pennsylvania, tried to secure the benefit of his experience in organizing the volunteers from that State, but the tender of the Major-Generalship of the Ohio forces reached him first, and he at once accepted it. On May 14th he received a commission as Major-General in the United States army, and now has command of the Department of Ohio, which comprises all of the State of Illinois, Indiana and Ohio, and that part of Virginia lying north of the Great Kanawha river, and west of the Green Briar river and the Maryland line, with so much of Pennylvania as lies west of a line drawn from the Maryland line to the northeast corner of McKean county.

General McClellan is now leading the United States forces which crossed from Ohio into Virginia on Monday, May 27th, and the stirring proclamation which he has issued to the people (published on another page) prove that he can wield the pen as ably as he has wielded the sword. He is regarded as one of the most able men in the field.

MAJOR-GENERAL JOHN C. FREMONT.

John Charles Fremont was born in Savannah, Ga., on Jan. 21, 1813, and is consequently in his forty-ninth year. His father was a native of France, and died in 1818. His mother, with three infant children, settled in Charleston. John Charles entered the Junior Class of Charleston College when only fifteen years of age, but was expelled before graduation for irregularities, and having succeeded in obtaining the position of Instructor of Mathematics on board the United States sloop of war *Natchez*, went on a two years' cruise to the coast of South America. After his return, the college which had expelled him gave him the degree of A. B., and soon afterward, having passed a rigorous examination, he was appointed Professor of Mathematics in the navy, and at once assumed the duties of instructor on board the frigate *Independence*. This post he did not long hold. Retiring from the navy, he occupied himself in railroad engineering in South Carolina and Tennessee until 1837, when he accompanied Captain Williams, of the United States Army, in a reconnoisance of the mountainous Cherokee country in Georgia, North Carolina and Tennessee, in anticipation of hostilities with the Indians. President Van Buren appointed him Second Lieutenant in the corps of Topographical Engineers in 1838, and the young man was suddenly sent off to make a survey of the Des Moines river, doubtless through the influence of Colonel Benton, for whose daughter he had formed an attachment. Immediately after his return from this duty, Lieutenant Fremont successfully engineered an elopement, and on Oct. 19, 1841, the lovers were secretly married.

On May 2, 1842, he left Washington to commence the scenes of exploration in the Rocky Mountains which have given him so wide a fame. The report of his first expedition, which was concluded in October, 1842, attracted great attention, and was praised by Humboldt, in his "Aspects of Nature." In May, 1843, Lieutenant Fremont started on a second expedition, much more comprehensive in its design than the first, extending through the valleys of the Columbia river. While on this expedition, he crossed the mountains on the Pacific coast, reaching Sutter's Fort, on the Sacramento, early in March, 1844, after forty days of unparalleled hardships and suffering. The preparation of the reports of this expedition occupied the remainder of that year, and in the spring of 1844, having been breveted Captain, he started on a third expedition to explore the great basin and maritime region of Oregon and California. This expedition was full of stirring incident, and during the course of it new proof of his ability and bravery as an officer was afforded by the manner in which he defended himself against the Mexican General Castro, who threatened to attack him with an overwhelming force. Subsequently, under Fremont's leadership, the Californians succeeded in expelling Castro from the northern part of the territory, and on July 4th, the American settlers elected Fremont Governor. About this time he was promoted to a Lieutenant-Colonelcy, and on Jan. 13, 1847, he concluded with the Mexicans articles of capitulation which terminated the war in California, and left that country in possession of the United States.

He resigned his position in the army, and in October, 1848, started on a fourth exploring expedition along the waters of the Upper Rio Grande, and through the country of the Apaches, Camanches, &c., hoping to find a practicable route to California. On this expedition, too, he and his companions endured the greatest hardships. In 1847, he purchased the celebrated Mariposa estate, which brought him great wealth and almost interminable lawsuits. In 1849, he was elected one of the United States Senators from California, druing the short term, and serving but three weeks. In 1852 he visited Europe, where he was received with every mark of respect by eminent men of letters and of science. In 1852, he made a fifth and highly successful exploring expedition between the Mississippi Valley and the Pacific, and in 1856 was nominated as a candidate for the Presidency.

He has recently received the appointment of Major-General in the army, and will soon return from Europe and enter the field.

MAJOR-GENERAL N. P. BANKS.

Nathaniel Prentiss Banks was born in Waltham, Mass., on Jan. 30, 1816. His father was the overseer of a cotton factory, and there the boy worked, now and then attending a common school, and always eagerly picking up whatever useful knowledge came in his way. Not content with the routine of a factory life, he apprenticed himself to a machinist, and while learning this trade his literary aspirations found room for development in the organization of a dramatic company, of which he was the "star," and in lecturing before lyceums, making political addresses, &c. Under the Polk administration, he received a berth in the Boston Custom House, and in 1849 was elected by the democrats to represent his district in the State Legislature. In 1851-2, the democrats and free-soilers coalesced and made him Speaker of the House, and afterward sent him to Washington as Representative. He was afterward elected Speaker of the House of Representatives. Mr. Banks was returned to Congress the next term, and was elevated to the Gubernatorial chair for the first time in 1857, by a coalition of the same elements which secured him a seat in Congress and the Speaker's chair. Three times the people of the State emphatically indorsed the manner in which he discharged the duties of this responsible position, and as parties were marshaling for the contest in the Fall of 1860, Mr. Banks took the State by surprise on announcing his intention to retire from political life. He removed to Chicago early in the present year, to connect himself with the Illinois Central Railroad, as Manager Director, and President Lincoln has just called him from this post to place him where he can serve his country to better advantage.

Governor Banks' great energy, his well-known administrative ability, and the military knowledge which he acquired while Commander-in-Chief of the Massachusetts militia, fit him admirably for his new duties.

MAJOR-GENERAL B. F. BUTLER.

If we except the great soldier who commands the armies of the Republic in this exigency of the Union, there is no man in the field of military action who, at this moment, concentres upon himself a larger share of public interest and attention than Major General Butler, of Massachusetts. This arises from a knowledge of what has been performed in Maryland by Gen. Butler, and anticipation of the important work in Virginia which has been assigned him by the President.

There is much curiosity to know something of the early history, the subsequent employment, the habit of mind and body of the citizen soldier, who, within the last four weeks, has accomplished results of such substantial national usefulness. It is not too much to say that, under the circumstances, the person who conceived and executed the thought of opening communication with Washington by way of Annapolis, saved the capital of the Union from attack by the arms of the Confederate States. It is not too much to say that Gen. Butler, by his memorable movement to Annapolis, his seizure of the ship *Constitution*, his official correspondence with Gov. Hicks, his occupation and repair of the road to Washington, his sudden encampment at the Relay House, his noble march to Baltimore; his posting cannon upon the hill overhanging the city, and his wise proclamation to the people of Baltimore, saved the State of Maryland from plunging into the black depths of treason, and from political and social woes unnumbered.

In all these public acts, not less than in his official correspondence with the Governor of Massachusetts, Gen. Butler has evinced wisdom, energy, and steadiness of purpose, uncontrolled by popular prejudice.

Gen. Butler was born at Deerfield, Rockingham Co., N. H., in 1818. Previous to the events of the 17th of April, his experience in military affairs was confined to the duties devolved upon him as a commissioned officer in the militia of the commonwealth of Massachusetts. He has been from boyhood prompt and enthusiastic in all matters concerning the volunteer militia system. He was for many years Colonel of the regiment belonging to the city of Lowell, where he resided.

It happened that among the first of the official acts of Gov. Gardner, of Massachusetts, who was elected by and during the Know Nothing paroxysm in that commonwealth, was a recommendation, in his annual message, of exclusion from the militia of the State of persons of foreign birth, and inquiry into the race and sect of certain companies, and, in the end, disbandment of seven companies bearing the following

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names ;—the Columbian Artillery, the Bay State Artillery, the Shields Artilliery, the Sarsfield Guards, the JacksonMusketeers, the Union Guards, and the Jackson Guards. One of the companies thus blotted out, the Jackson Musketeers, was in the regiment of Col. Butler, and he refused to transmit the order disbanding the proscribed company, and for the refusal he was summarily broken of command by Gov. Gardner. In a short time, however, the officers of the brigade to which Butler's regiment belonged, elected him to be Brigadier-General, and the same Governor who had expelled him from one office, was compelled to commission him to the higher office, held by Gen. Butler when he recently rendered the Union such memorable service in Maryland.

It was this interest taken by Gen. Butler in military affairs, not less than his pre-eminent fitness in other respects, which induced President Pierce to designate him as one of the visitors to West Point in the year 1856.

But it is as a lawyer and leading member of the Democratic organization that Gen. Butler is best known. In the legal profession, it is the common admission, that since the death of Choate, he now stands first in the commonwealth. Other men have more knowledge in special departments in the profession, but none can do all things required of a lawyer as well as he. Cushing has a broader reach of learning in constitutional law, and in the legal treatises of the Continent ; Curtis or Bartlett may be more familiar with branches of admiralty and commercial law, in which they have had large experience, but in the combined branches of commercial, criminal and real property jurisprudence, no man in Massachusetts is so generally employed or so successful in results. This fact bespeaks volumes, because no ordinary man ever, by common consent of lawyers and laymen, attains the higher eminences of professional fame.

In politics Gen. Butler has been a zealous member of the democratic organization, having brought from his New Hampshire home the earnestness of conviction which is so conspicuous in the politics of that State, and in the last Presidential election he was an uncompromising opponent of Lincoln and Douglas, and devoted to the cause of Mr. Breckinridge. In 1853 he was a member of the Massachusetts House of Representatives ; in 1859 and 1860 he represented Middlesex in the State Senate. He also took a prominent part in the Constitutional Convention of 1853.

We find in the Charlestown *Advertiser* (Mass.) of Sept. 7, 1859, a portrait of Gen. Butler, drawn a year previous to that time, and by an eminent member of the Massachusetts bar, an opponent in politics, which is so apparently truthful in tone, that we copy extracts therefrom, as of special interest at this time :

The time has come when an accurate, full-length portrait of this man should be seen by the people. We can draw such, and will. It shan't be overdrawn, either way. We have advantages of position, and knowledge to do it well. We know our subject "like a book." To use one of his own oft-repeated phrases, we've "summered and wintered him for years." We are not his partisan. Yet we bear him no malice, but friendship rather. We *don't holler* for him, nor, so to speak, "run with the machine," to wit, the Democratic Party. Yet it is true to say, we rather like him, and wouldn't knowingly do him an injury or an injustice. But one thing let not the reader exact of us. Seek herein no portrayal of his physical features. Our brush would drop from the palsied arm before such a task. Hayden would have committed his suicide years earlier than he did had such an exaction been demanded of his great powers in the portrait line. No ; we will agree to turn the General wrong side out, so that he who reads can discover his methods of thought, and discern the inmost depths of his mind and heart ; but as nature clearly broke the mold in shaping the exterior, our finite powers reluct from the impossible task of reproducing it here. It can't be done by comparison, for precisely such an apparition on two legs never came athwart the path of an every-day Christian, in this land of daguerreotypes. It can't be done by the imagination, for the boldest flight of fancy never brought back on its nimble pinions, so impossible a combination of features. A witness on the stand, gazing down upon it for the moment, perhaps has an idea of its inconceivable type. But it is a phenomenon he never can recall. Ever after it exists as a dim and imperfect vision, flitting on the outskirts of the mind, so to speak, and all attempts at a description thereof are necessarily failures.

But below the neck our democratic friends can talk understandingly of their candidate. He is neither fat, nor hath he "the lean and hungry look" that so alarmed Cæsar of the old time, when he discovered it in the sleepless Cassius. Like Dr. Stop, he has a "sesquipedality of belly." This gives him quite a substantial look. But yet he is nimble. For, as Dr. Watts would say, he is still in the "heat of youthful blood." He is not far from forty. His health is perfect. His constitution is in no manner impaired by early excesses, if, indeed, he were ever guilty of any. If he were they never could he traced in his physical condition. Nothing but the apoplexy or a raging fever can bring such a constitution to the ground. It is as sound and compact as the Federal Constitution. He merely staggered under an attack that sent many wailing ghosts to the Plutonian realm—the National Hotel Poison. He imbibed the poison, or inhaled it, or ate it as copiously as they. He took no better care of himself than they of themselves. But in his case the disease got decidedly the worst of it. "The *man* recovered of the bite ; the *dog* it was that died." Twice that amount of poison he would have vanquished. Few men, indeed, "can endure the winter's cold as well as he," or the Summer's heat, or hard and incessant mental or physical labor. In this fact is found his greatest element of strength, in our judgment. This is the primary cause of his bestriding the democratic fold, Beach, Davis, Choate, and all hands, so like a Colossus. It is the key to all his successes. It is the reason why he tries so many causes, more than any other one man in the Commonwealth. "*He can stand it.*" He of whom that sentence can be truly uttered is the happiest, or ought to be the happiest man in a State. And of Butler it can be said, he can labor always "and never tire." Indeed, he grows more vigorous the longer he remains in harness. In the months that are coming he will be found trying causes in the day time ; making stump speeches at night, directing the campaign on Sundays, and resting and recreating never at all. He isn't the famous "*son* of the sleepless :" he is *Old Sleepless* himself. He will, with his admirable constitution, run on like Deacon Holmes "one-hoss shay," and, like it, "go to pieces all at once."

Thus far, to recapitulate, we have got the General's outlines—a sound body, with no very handsome headpiece.

He was born in New Hampshire. He worked his own way to college, and through it, at Waterville, Maine. It is safe to say that his *alma mater* never graduated such another. He supported himself in college by making chairs. And let not the voters forget this. Through life he has cut his own way, and a wide, long breadth of swarth has he carried. He has wrung success from men and circumstances, moreover, that were reluctant to concede it to him. And in so doing he has indicated his great strength. When he first came to the bar the Courts looked upon him as a sort of portentous phenomenon, such as never before came athwart the judicial vision. He had no family influence to aid his young steps. He had no friends to "blow for him," as the phrase is. His early days were spent in steady rowing up stream with a strong wind and the current both dead against him. But he never faltered. He cleared the rapids, and up he continued to sail. He is in calmer water now. He might anchor if he would. But his temperament will never suffer him to rest this side the "narrow house." The fact that all he has and all he is are the conquest of his own energy, is a fact that indicates his pluck. He may be safely set down as a man of irrepressible energy.

His mind is not logical. He don't state a case with logical precision. He can tell it with sophistical deception ; and he will make it look like logic. Unless you look again, perhaps you would call it logic. But try it again, and you will detect the dull copper sound. He often believes his own sophistry, so ingeniously does he construct it. His arguments to the jury in all "hard cases" are made up of the most ingenious sophistries ; sometimes, indeed, mixed with imposing absurdities. But he presses all with equal vehemence, and apparently has as much confidence in his copper as in his golden coin. And sometimes they are quite as successful. His fallacies are most ingenious and difficult to unravel. His arguments have not even method, saying nothing of logic. He skips from one theme to another and back again, with bewildering celerity. The hearer can have no idea of what he will discuss, or how long he will be at it, from hearing him start, for he often begins in the middle and ends with some squibs on some collateral matter. But, notwithstanding the truth of all these criticisms, his arguments are always ingenious and most effective. They always endanger the adversary —they often utterly overwhelm him. They abound in insinuations. They are set with homely illustrations, and such as "split the ears of the groundlings."

He is not a fluent nor graceful speaker. His voice is harsh and grating. There is no mistaking his meaning. He uses "talk words" with fiery vehemence. He makes awkward work when he undertakes to utter compliments. But he smites an adversary with the plainest of Anglo-Saxon epithets, as though he had had long practice in their use, as, indeed, he has. The laughs he creates are more apt to be in the rear seats than on the bench or in the bar. His wit, though often sharp, is undeniably more not to be appreciated among the "general" than among cultivated men. He looks to them—"*caviare* to the general," is his motto. But not unfrequently he perpetrates things that would do no discredit to Jekyll in his best days. But his wit needs chastening and softening, in a large degree. It would then bite with a keener edge. It often gives offence to the hearer who isn't hit by it, by its coarseness and blunt edge. He is a faithful and steadfast friend. His zeal in his client's cause never flags for an instant. His fidelity to his client is never shaken ; and the fidelity is equally strong in all cases. It isn't at all measured by the fees received. Pay or no pay, the earnestness and the energy are the same so long as the relation of attorney and client continues. But this isn't peculiar to Mr. Butler. All decent lawyers are equally faithful and zealous. We have seen many kinds of corruption and misconduct in our time, but never yet encountered that worse than Judas Iscariot or Benedict Arnold, a lawyer that would betray a client's trust and go over to the adversary, or have his zeal abated by a bribe. But the General has a memory, we think, especially tenacious of friendly acts. He is quite apt not to forget or wholly to forgive injuries, real or fancied. But no temptation would cause him to desert or betray a friend.

He lives in a style anything but Democratic, according to our New England ideas. Scarcely any other lawyer, from the income of his profession, could maintain such an establishment as his. But he has earned it by his energy, industry and perseverance. And though we hope he may be unsuccessful in his politics, we hope he may survive through many years of happy life in his elegant residence on the banks of the Merrimac, with its "shrubbery," which Shenstone indeed might envy. "Ability," quoth the lexicographer, "means the art of accomplishing." Then General Butler is as able a man as walks the soil of Massachusetts. He has all the elements necessary for the successful accomplishment of whatever he undertakes. He has a resolute will. He is fertile in resources. He is ingenious.

He is a genial companion. His wit, in conversation, tells better than in formal speeches or arguments. He can set and keep the "table in a roar."

The qualities which we have herein ascribed to the General that seem sinister, are common to the race of mortals. They are more obvious in him because he is no hypocrite, and lets his words and actions faithfully exhibit what is working within him. He is in earnest and zealous. He compromises nothing. If he feels anger he don't smother it. He lets nothing rankle. He don't "smile, and smile and be a villian still." On the contrary, his enemies as well as his friends know in what regard he holds them. His dislikes and likes are both earnest and enduring. And, on the whole, it cannot be doubted that he is the most skillful lawyer in many respects now living in New England, even though Mr. Choate be among that number.

We look down the line and find hardly one whom this young athlete has not conquered in open forensic encounter.

The scalps of Choate, the distinguished head of the American bar, of Lord, who leads the Essex circuit without a rival, and Judge Abbott, among the living, and of Farley, the sturdiest advocate that Middlesex County has yielded from loins prolific of lawyers, we have seen dangling from his belt.

BRIGADIER-GENERAL IRVIN MCDOWELL.

Brigadier-General Irvin McDowell, now in command of the United States forces in Alexandria and its vicinity, is a native of Ohio, and a nephew of General Cass. In his early youth he was sent to France to be educated, and spent some years at a celebrated school at Troyes in the interior of that country. On his return from France, he entered the United States Military Academy, from which he was graduated in 1838, in the same class with General Beauregard, and appointed with that officer a 2d Lieutenant in the 1st artillery, in the same year. In 1845 he was appointed aid-de-camp to General Wool, and in the following year, Assistant Adjutant-General, with the brevet rank of captain. Beauregard, in the meantime, had been transferred to the engineer corps, with which he served with great distinction in Mexico. At the close of the Mexican war, Captain McDowell was attached to the staff of General Scott, in which capacity he remained until he received promotion. He is about forty-three years of age, and is married to a daughter of Henry Burden, of Troy, the celebrated iron manufacturer and inventor. General McDowall is a thorough soldier—of great physical endurance, and of the best kind of training for his present position.

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BRIGADIER-GENERAL NATHANIEL LYON.

Nathaniel Lyon was born in Connecticut in 1821, and entered the Military Academy at West Point in 1837, where he graduated four years afterward with the rank of 2d Lieutenant of the 2d infantry. In February, 1847, he was made 1st Lieutenant, and for gallant conduct in the battles of Contreras and Cherubusco during August following he was breveted captain. On September 13th, he was severely wounded in the assault on the Belen gate, and in June, 1851, was promoted to a Captaincy. This rank he held at the time of the trouble in Kansas, whither he was sent during the Presidency of General Pierce. Not altogether liking the way in which things were managed there in a political sense, he threw up his commission and retired to private life. He was in command of the Missouri Volunteers at the recent capture of Camp Jackson, and for his well-proven bravery and eminent military ability has received his recent promotion, and is now in command of the department of Missouri.

ISSUED FROM THE UNITED STATES PATENT OFFICE

Reported Officially for the Scientific American.

*** Pamphlets giving full particulars of the mode of applying for patents, under the new law which went into force March 4, 1861, specifying size of model required, and much other information useful to inventors, may be had gratis by addressing MUNN & CO., Publishers of the SCIENTIFIC AMERICAN, New York.

A SCREW LOOSE AT THE PATENT OFFICE.

The last list of claims received from the Patent Office for publication contained the patents of May 14th, and were printed in our last number. By some unaccountable delay at the Patent Office, we had not, at the time of going to press this week, received the claims of Patents issued on the 21st and 28th ult., and 4th inst., all of which were due, and the first list should have been furnished us for publication more than two weeks' ago, according to the system adopted and inforced by previous Commissioners.

This slip shod way of transacting business renders it impossible for us to state whether we shall probably have the list of claims due on the 21st of May in time for even our next issue. There are, no doubt, at least 20,000 weekly readers of the SCIENTIFIC AMERICAN, in this country and Europe, who are interested in patents, and who depend upon these columns for an accurate report of the doings at the United States Patent Office, and we hope not to be obliged to apologize again to our readers for the absence from our columns of the official list of claims, or to upbraid the Patent Office for its seeming laxity. Inventors may depend, however, upon their *institution* at Washington being looked after by us and any mismanagement exposed.

BURNHAM'S BREECH-LOADING CANNON, made at Chicopee Falls, and provided with a chambered breech, was exhibited in front of the City Hall on the 5th inst. The cylinder is bronze metal; the breech-chamber is of steel, and is thrown up by a screw to receive the charge, then depressed to make the chamber range with the tube or cylinder. The movement of the chamber is vertical, swinging on a hinge below operated by the screws at the back end. The gun weighs 400 lbs.; the shot is a two-inch elongated bullet, weighing 6 lbs., with lead bands to fit the bore. The iron shell has prongs cast upon it to hold the lead bands, and prevent them flying off when the bullet is discharged. The grooves are of regular twist, making one turn in 16 feet. The workmanship of this light field piece does great credit to the manufacturers.

THE London *Engineer* of May 3d says: "As a rule, low pressure boilers generally produce the most destructive results by explosion, because of the greater quantity of water which they contain." The conclusion as to the cause of great violence in such explosions is certainly a strange idea.

Making Lint by Machinery.

The London *Chemist and Druggist* says that wholesale orders for articles in the druggists' trade from the United States have almost entirely ceased except for plasters and lint, and that for the latter article the orders are far beyond the supply. There has been, for several years, a large importation of patent lint into this country from England, and the *Chemist and Druggist* gives a brief description of the mode of its manufacture. The old hand process is first described. In this, the linen rag or cloth was stretched on a small table, and a sharp knife, suspended above it, with the edge parallel with one series of the threads, the filling, for instance, was brought down upon the cloth with a force so exactly adjusted that it cut part way through those threads which were at right angles with the edge of the blade. The knife then received a slight motion lengthwise, turning up the severed fibres in a very light, loose, soft, feathery nap; and the sheet of lent was still left with considerable strength in the direction of the threads which lay parallel with the knife, and which were consequently not cut.

This hand manufacture has been superseded by machines which operate in substantially the same manner as the old hand process; some of the machines having rotary knives and others reciprocating. The lint made by the latter is considered the best, as the knives beat and soften the cloth on which they raise the pile. A suitable fabric is now woven expressly for the lint manufacturer in lengths of 100 yards.

ON the night when the regiments first entered Virginia, a band of noble-hearted ladies belonging to the Fourth Presbyterian church in Washington city took up their position on the Long Bridge, and presented Havelocks to the soldiers who were not previously provided with such useful coverings for the head.

PERSONAL.—We have received a call from George Hazeltine, Esq., editor of the *London American*. He visits this country to gain information concerning the progress of events connected with the war, and it is gratifying to know that his journal affords a vigorous support to the Federal government in its efforts to arrest the most monstrous rebellion that ever existed.

D. J., of Ill.—We would cheerfully furnish you with all the advice in our power in reference to the formation of artillery companies, but we have no practical information on this subject. We hope you can be supplied with rifled cannon. You can obtain in this city the following works on artillery: "The Artillerist's Manual," by J. Gibbon, compiled from various sources, and adapted to the service of the United States. It can be had for $5, and is thought to be the best work on the subject extant. Colonel Anderson, of Sumter fame, translated from the French, and arranged for our army, the "Evolutions of Field Batteries of Artillery." The price of it is $1.

D. H. J., of Wis.—You propose to construct a submarine tunnel across a river by using a great tube of waterproof canvas, in which the builders shall work in erecting a stone arch on the bottom of the river. Such a tube could not stand the pressure of the water; it would collapse like a pipe of soft clay in the hands of the potter. On page 233, Vol. XII., and page 336, Vol, XIII. (old series), of the SCIENTIFIC AMERICAN, there are illustrations of submarine tunnels proposed for the East river, this city. When Brunel constructed the great tunnel under the river Thames, he employed a huge iron shield to support the roof of the tunnel as he advanced in laying the arch.

F. B., of Pa.—Henry Cort is dead, but we believe his heirs have received some compensation for his valuable discoveries in the manufacture of iron. He discovered the process of converting pig iron into wrought iron by the flame of pit coal in a puddling furnace, thus dispensing with the use of charcoal, which, owing to its scarcity and importance, made Cort's discovery of great value. He is also the inventor of drawing iron into bars by means of grooved rollers, an operation previously performed by hammer and anvil.

W. B. G., of N. Y.—A properly balanced bullet could be shot as accurately from a smooth bore gun as from a rifle, if absolute perfection were also obtained in the gun. We doubt whether such perfection is practically obtainable. Your plan of floating the bullets in mercury would doubtless insure a high degree of perfection in the bullets.

C. N., of Mo.—We support the government, not as a party organization, but as the governing power, entitled to the obedience of every citizen. When a change is to be made in the officers, let it be done in the manner prescribed by the Constitution. Thus only can our country be saved from anarchy and confusion. It seems to us you cannot fail to appreciate our position; and if the people of your State are loyal, or even alive to their best interests, they will hold on to the Union as their best and only hope. Secession will involve you in war and ruin.

C. E., of Mass.—James Watt died in 1819, at the great age of 83 years. There is a fine monument to his memory in Westminster Abbey, executed by Chantrey at a cost of $30,000. His best monument, is his work. In this sense the steam power of the world must be considered. It is estimated that the steam power of Great Britain is equivalent to the manual labor of 400,000,000 men, or more than double the number of males supposed to inhabit the globe.

W. B. S., of R. I.—We claim for Charles Goodyear the process of vulcanizing india-rubber, and believe him entitled to it. The English, however, persist in awarding the claim to Thomas Hancock, who made a good many experiments in this department.

J. P., of N. Y.—We are prepared to prosecute your foreign patents with all possible dispatch. We only require the use of the Letters Patent, and to be furnished with such suggestions as you may have to make in regard to the claims. Parties who apply for patents in Europe usually select Great Britain, France and Belgium.

J. U., of N. Y.—Fulminating quicksilver (powder for percussion caps) is made as follows:—Take 1 lb. of quicksilver and dissolve it in 10 lbs. of pure nitric acid. Now pour this solution into 8 lbs. of absolute alcohol contained in a stoneware vessel. This must be done with great care. A violent reaction ensues, accompanied with the evolution of white vapor, and the result is a precipitate in the form of a dense gray powder. This is the fulminate of mercury. It is washed with water and kept in a moist state (in which it is perfectly harmless) until required for use.

H. S. P., of Vt.—We do not know where you can obtain magnetic masks for needle makers. The heating of telegraph wires affects but does not destroy their conducting properties.

J. M. K., of Conn.—The indigo and woad blue are the only real permanent blue colors known to us for woolen fabrics. Royal blue dyed with the prussiate of potash, some logwood and the muriate of tin is almost a permanent color, still it is not equal to that of indigo.

T. A. B., of Pa.—To remove tar from clothes rub some warm butter or olive oil upon the spots; this will soften the tar which may now be washed off with soap and water. We use clean water and a clean sponge for removing dirt from plaster-of-Paris images. A solution of alum applied to plaster casts tend to render their surface very hard when it dries.

J. R. A., of C. T.—Your suggestion of making shells with two chambers, one within the other, the inner one filled with powder to produce its explosion, and the outer one with chloroform to send the occupants of a fort to sleep when the shells explode, is very ingenious, but we fear it is impracticable, as it seems to us that the vapor of chloroform would not be sufficiently concentrated. The vapor of chloroform, to produce sleep or stupefaction, must be inhaled without being much diluted with atmospheric air as much as we think it would be when diffused as you propose. If this difficulty could be shown not to exist, we think you could obtain a patent. We think your idea about the breech-loading cannon is new and patentable. Either invention would require a model for the Patent Office.

A. F. F., of Vt.—The attachment of knives to cannon balls in such manner as to be closed when the ball is placed in the gun, and thrown out when the ball is discharged, is a very old idea. We do not know whether such balls have ever been used; we never heard of their use.

C. F. J., of N. J.—India rubber dissolved in turpentine, and mixed with copal varnish makes a very good water-proof cement which may answer your purpose, but no solution of glue, so far as we know, is water-proof. The cement called marine glue does not contain any glue; it is an india rubber and varnish compound.

E. M. F., of Phila.—Marriotte's law, that "the elastic force of any given amount of gas, the temperature of which remains the same, varies inversely as its volume," is correct for all pressures. You must remember that the temperature of gases varies with the pressure.

J. Y., of Pa.—Point blank range is too indefinite to render a reply to your question possible. Point blank shot is a shot with the gun in a horizontal position, and the point blank range is the distance from the gun thus fired at which the shot first strikes the ground. Of course this will vary with the hight at which the gun is held from the ground, and until some definite standard is established for the latter, the point blank range is a term with no precise signification. Your case, we hope, will be acted upon soon.

Money Received

At the Scientific American Office on account of Patent Office business, during one week preceding Wednesday, June 5, 1861:—

N. G. S., of N. Y., $40; B. H., of Ill., $25; A. H. D., of Cal., $15; T. R. R., of Ohio, $15; P. & L., of Mich., $10; W. C. and J. D., of N. Y., $20; W. J. S., of N. Y., $45; S. S. H., of Maine, $20; C. T. P., of N. Y., $350; G. L., of N. Y., $20; F. D., of Ohio, $25; F. R., of Ind., $25; E. L. E., of Conn., $15; C. A. C., of Mich., $10; T. H. K., of N. Y., $22; S. J. A., of Cal., $20; J. J. S., of N. Y., $15; J. F., of Wis. $15; W. & M., of N. H., $40; S. A. B., of N. Y., $25; G. W. B., of N. Y., $10; J. H., of Wis., $15; W. H., of Pa., $25; F. & W., of Iowa, $15; M. L. R. H., of Ill., $25; J. R. J., of N. Y., $45; N. M., of Ohio, $40; S. S. H., of N. Y., $20; M. J. K., of N. Y., $20; K. & T., of N. Y., $20; A. R., of N. Y., $43; J. Q., of Min., $25; J. N. P. H., of Maine, $15; W. B., Jr., of N. Y., $43; J. B., of Vt., $15; B. & P., of N. Y., $100; S. & F., of Pa., $40; M. D. C., of Vt., $15; A. R. D., of N. Y., $30; N. G. S., of N. Y., $25; J. McA. G., of Mass., $20; J. H., of Ohio, $30; J. T. L., of L. I., $15; S. H. H., of Ill., $25; F. R., of Ind., $25; G. L. T., of Mass., $20; L. B. S., of Conn., $15; J. S. S., of N. Y., $20; B. & W., of N. Y., $20; A. J. S., of Ill., $20; S. & G., of N. Y., $25; K. P. K., of Vt., $15; S. J. P., of Conn., $15; D. M. C., of Ind., $15; J. C., of Ohio, $20; H. K., of Conn., $15; J. L., of L. I., $250; C. A. S., of Wis., $15; T. C. H., of N. Y., $30.

Specifications and drawings and models belonging to parties with the following initials have been forwarded to the Patent Office from May 29 to Wednesday, June 5, 1861:—

S. H. H., of Ill.; J. K. P., of Mich.; J. McA. G., of Mass.; P. G. B., of Cal.; E. L. E., of Conn.; W. B., Jr., of N. Y.; Mrs. L. S. H., of N. Y.; L. D. G., of N. J.; F. R., of Ind.; W. H., of Pa.; N. G. S., of N. Y.; W. J. S., of N. Y.; A. R., of N. Y.; J. G., of Mass.; M. L. R. H., of Iowa; B. H., of Ill.; S. A. B., of N. Y.; S. J. P., of Conn.; C. A. C., of Mich.; L. B. S., of Conn.

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CHANGE IN THE PATENT LAWS.

NEW ARRANGEMENTS---PATENTS GRANTED FOR SEVENTEEN YEARS.

The new Patent Laws, recently enacted by Congress, are now in full force, and promise to be of great benefit to all parties who are concerned in new inventions.

The duration of patents granted under the new act is prolonged to SEVENTEEN years, and the government fee required on filing an application for a patent is reduced from **$30** down to **$15**. Other changes the fees are also made as follows:—

On filing each Caveat	$10
On filing each application for a Patent, except for a design	$15
On issuing each original Patent	$20
On appeal to Commissioner of Patents	$20
On application for Re-issue	$30
On application for Extension of Patent	$50
On granting the Extension	$50
On filing Disclaimer	$10
On filing application for Design, three and a half years	$10
On filing application for Design, seven years	$15
On filing application for Design, fourteen years	$30

The law abolishes discrimination in fees required of foreigners, except in reference to such countries as discriminate against citizens of the United States—thus allowing English, French, Belgian, Austrian, Russian, Spanish, and all other foreigners except the Canadians, to enjoy all the privileges of our patent system (except in cases of designs) on the above terms.

During the last sixteen years, the business of procuring Patents for new inventions in the United States and all foreign countries has been conducted by Messrs. MUNN & CO., in connection with the publication of the SCIENTIFIC AMERICAN; and as an evidence of the confidence reposed in our Agency by the Inventors throughout the country, we would state that we have acted as agents for more than FIFTEEN THOUSAND Inventors! In fact, the publishers of this paper have become identified with the whole brotherhood of Inventors and Patentees, at home and abroad. Thousands of Inventors for whom we have taken out Patents have addressed to us most flattering testimonials for the services we have rendered them, and the wealth which has inured to the Inventors whose Patents were secured through this Office, and afterward illustrated in the SCIENTIFIC AMERICAN, would amount to many millions of dollars! We would state that we never had a more efficient corps of Draughtsmen and Specification Writers than are employed at present in our extensive Offices, and we are prepared to attend to Patent business of all kinds in the quickest time, and on the most liberal terms.

Testimonials.

The annexed letters, from the last three Commissioner of Patents, we commend to the perusal of all persons interested in obtaining Patents:—

Messrs. MUNN & Co.:—I take pleasure in stating that, while I held the office of Commissioner of Patents, MORE THAN ONE-FOURTH OF ALL THE BUSINESS OF THE OFFICE CAME THROUGH YOUR HANDS. I have no doubt that the public confidence thus indicated has been fully deserved, as I have always observed, in all your intercourse with the Office, a marked degree of promptness, skill and fidelity to the interests of your employers. Yours, very truly,

CHAS. MASON.

Immediately after the appointment of Mr. Holt to the office of Postmaster-General of the United States, he addressed to us the subjoined very gratifying testimonial:—

Messrs. MUNN & Co.:—It affords me much pleasure to bear testimony to the able and efficient manner in which you have discharged your duties of Solicitors of Patents while I had the honor of holding the office of Commissioner. Your business was very large, and you sustained (and, I doubt not, justly deserved) the reputation of energy, marked ability and uncompromising fidelity in performing your professional engagements. Very respectfully,

Your obedient servant, J. HOLT.

MESSRS. MUNN & Co.:—Gentleman: It gives me much pleasure to say that, during the time of my holding the office of Commissioner of Patents, a very large proportion of the business of inventors before the Patent Office was transacted through your agency, and that I have ever found you faithful and devoted to the interests of your clients, as well as eminently qualified to perform the duties of Patent Attorneys with skill and accuracy. Very respectfully,

Your obedient servant, WM. D. BISHOP.

The Examination of Inventions.

Persons having conceived an idea which they think may be patentable, are advised to make a sketch or model of their invention, and submit it to us, with a full description, for advice. The points of novelty are carefully examined, and a reply written corresponding with the facts, free of charge. Address MUNN & CO., No. 37 Park-row, New York.

Preliminary Examinations at the Patent Office.

The advice we render gratuitously upon examining an invention does not extend to a search at the Patent Office, to see if a like invention has been presented there, but is an opinion based upon what knowledge we may acquire of a similar invention from the records in our Home Office. But for a fee of $5, accompanied with a model or drawing and description, we have a special search made at the United States Patent Office, and a report setting forth the prospects of obtaining a Patent, &c., made up and mailed to the Inventor, with a pamphlet, giving instructions for further proceedings. These preliminary examinations are made through our Branch Office, corner of F and Seventh-streets, Washington, by experienced and competent persons. Over 1,500 of these examinations were made last year through this Office, and as a measure of prudence and economy, we usually advise Inventors to have a preliminary examination made. Address MUNN & CO., No. 37 Park-row, New York.

Caveats.

Persons desiring to file a Caveat can have the papers prepared in the shortest time by sending a sketch and description of the invention. The government fee for a Caveat, under the new law, is $10. A pamphlet of advice regarding applications for Patents and Caveats furnished gratis on application by mail. Address MUNN & CO., No. 37 Park-row New York.

How to Make an Application for a Patent.

Every applicant for a Patent must furnish a model of his invention, if susceptible of one; or if the invention is a chemical production, he must furnish samples of the ingredients of which his composition is composed, for the Patent Office. These should be securely packed, the Inventor's name marked on them, and sent, with the government fee, by express. The express charge should be prepaid. Small models from a distance can often be sent cheaper by mail. The safest way to remit money is by draft on New York, payable to the order of Munn & Co. Persons who live in remote parts of the country can usually purchase drafts from their merchants on their New York correspondents; but if not convenient to do so, there is but little risk in sending bank bills by mail, having the letter registered by the postmaster. Address MUNN & CO No 37 Park-row New York.

Rejected Applications.

We are prepared to undertake the investigation and prosecution of rejected cases, on reasonable terms. The close proximity of our Washington Agency to the Patent Office affords us rare opportunities for the examination and comparison of references, models, drawings, documents, &c. Our success in the prosecution of rejected cases has been very great. The principal portion of our charge is generally left dependent upon the final result.

All persons having rejected cases which they desire to have prosecuted are invited to correspond with us on the subject, giving a brief history of their case, inclosing the official letters, &c.

Foreign Patents.

We are very extensively engaged in the preparation and securing of Patents in the various European countries. For the transaction of this business, we have offices at Nos. 66 Chancery-lane, London; 29 Boulevard St. Martin, Paris; and 26 Rue des Eperonniers, Brussels. We think we can safely say that THREE-FOURTHS of all the European Patents secured to American citizens are procured through our Agency.

Inventors will do well to bear in mind that the English law does not limit the issue of Patents to Inventors. Any one can take out a Patent there.

Circulars of information concerning the proper course to be pursued in obtaining Patents in foreign countries through our Agency, the requirements of different Patent Offices, &c., may be had gratis upon application at our principal office, No. 37 Park-row, New York, or either of our Branch Offices.

Interferences.

We offer our services to examine witnesses in cases of interference, to prepare arguments, and appear before the Commissioner of Patents or in the United States Court, as counsel in conducting interferences or appeals.

For further information, send for a copy of "*Hints to Inventors.*" Furnished free. Address MUNN & CO., No. 37 Park-row, New York.

The Validity of Patents.

Persons who are about purchasing Patent property, or Patentees who are about erecting extensive works for manufacturing under their Patents, should have their claims examined carefully by competent attorneys, to see if they are not likely to infringe some existing Patent, before making large investments. Written opinions on the validity of Patents, after careful examination into the facts, can be had for a reasonable remuneration. The price for such services is always settled upon in advance, after knowing the nature of the invention and being informed of the points on which an opinion is solicited. For further particulars, address MUNN & CO., No. 37 Park-row, New York.

Extension of Patents.

Valuable Patents are annually expiring which might be extended and bring fortunes to the households of many a poor Inventor or his family. We have had much experience in procuring the extension of Patents; and, as an evidence of our success in this department, we would state that, in all our immense practice, we have lost but *two* cases, and these were unsuccessful from causes entirely beyond our control.

It is important that extension cases should be managed by attorneys of the utmost skill to insure success. All documents connected with extensions require to be carefully drawn up, as any discrepancy or untruth exhibited in the papers is very liable to defeat the application.

Of all business connected with Patents, it is most important that extensions should be intrusted only to those who have had long experience, and understand the kind of evidence to be furnished the Patent Office, and the manner of presenting it. The heirs of a deceased Patentee may apply for an extension. Parties should arrange for an application for an extension at least six months before the expiration of the Patent.

For further information as to terms and mode of procedure in obtaining an extension, address MUNN & CO., No. 37 Park-row, New York.

Assignments of Patents.

The assignment of Patents, and agreements between Patentees and manufacturers, carefully prepared and placed upon the records at the Patent Office. Address MUNN & CO., at the Scientific American Patent Agency, No. 37 Park-row, New York.

It would require many columns to detail all the ways in which the nventor or Patentee may be served at our offices. We cordially invite all who have anything to do with Patent property or inventions to call at our extensive offices, No. 37 Park-row, New York, where any questions regarding the rights of Patentees, will be cheerfully answered.

Communications and remittances by mail, and models by express prepaid), should be addressed to MUNN & CO., No. 37 Park-row, New York.

TO OUR READERS.

Models are required to accompany applications for Patents under the new law, the same as formerly, except on Design Patents, when two good drawings are all that is required to accompany the petition, specification and oath, except the government fee.

PATENT CLAIMS.—Persons desiring the claim of any invention which has been patented within thirty years, can obtain a copy by addressing a note to this office, stating the name of the patentee and date of patent, when known, and inclosing $1 as fee for copying. We can also furnish a sketch of any patented machine issued since 1853, to accompany the claim, on receipt of $2. Address MUNN & CO., Patent Solicitors, No. 37 Park Row, New York.

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NEW PAMPHLETS IN GERMAN.—We have just issued a revised edition of our pamphlet of *Instructions to Inventors*, containing a digest of the fees required under the new Patent Law, &c., printed in the German language, which persons can have gratis upon application to this office. Address MUNN & CO.,

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N. E. HALE, MANUFACTURER OF PATENT BELT Hook Pliers and Belt Punch, Nashua, N. H. 15 11*

Zur Beachtung für deutsche Erfinder.

Die Unterzeichneten haben eine Anleitung, die Erfindern das Verhalten angibt, um sich ihre Patente zu sichern, he ausgegeben, und verabfolgen solche gratis an dieselben.

Erfinder, welche nicht mit der englischen Sprache bekann sind, können ihre Mittheilungen in der deutschen Sprache machen. Skizzen von Erfindungen mit kurzen, deutlich geschriebenen Beschreibungen beliebe man zu addressiren an

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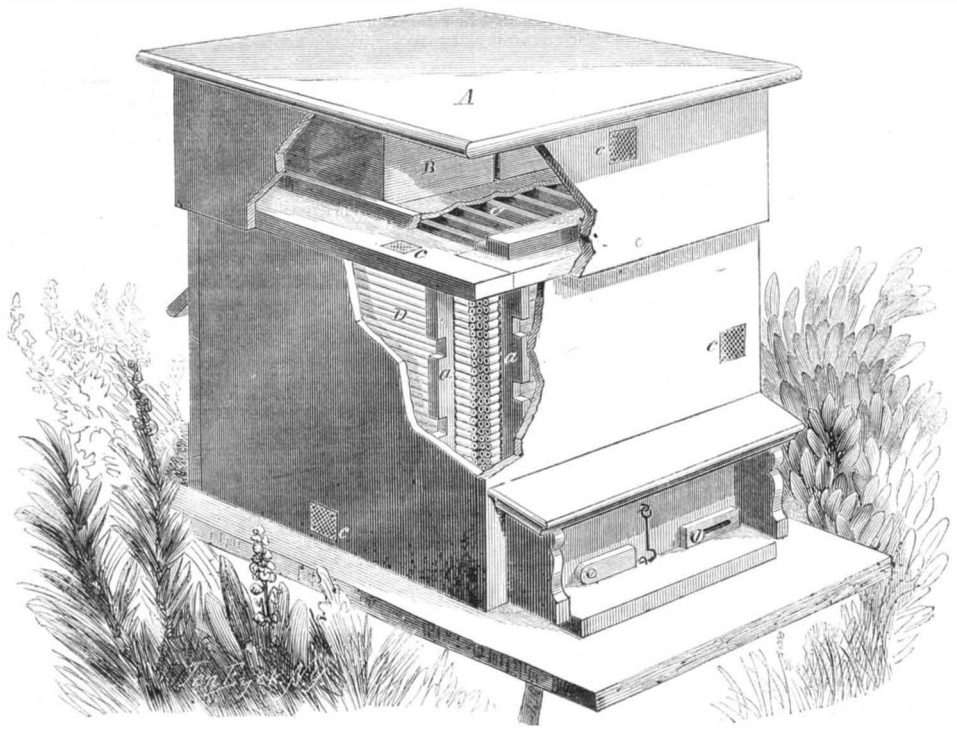
Improved Beehive.

Bees, as is well known to apiarists, keep themselves warm in winter by collecting together in a mass within the hive, the animal heat being sufficient for the purpose. The moisture exhaled by the insects condenses in ill-ventilated hives, and if the hives are thin and not protected from the cold, the moisture frequently freezes, killing the bees. If the hives are well protected from the cold, if they are not well ventilated, the moisture collects, engendering disease among the bees and causing the comb to mold. To obviate these evils is the object of the invention here illustrated.

It consists essentially of a lining of straw between the walls of the hive and the comb frame or box. A represents the body of the hive, which may be of rectangular form, and provided, as usual, with spare



IDE'S IMPROVED BEEHIVE.

honey boxes, B, placed above the comb frame or box, C. Between the comb frame, C, and the external walls of the hive there is a space all around the hive in which straw, D, is placed horizontally, so as to form a series of tubes; spaces being allowed both at the inner and outer sides of the straw, to admit of a circulation of air at each side of the straw as well as through it. Strips, *a*, with notches, as shown, allow the air to circulate freely between the straw lining and the outer walls of the hive.

The hive is perforated at its front and back ends, as shown at *c*. These holes are covered with wire cloth and serve as ventilators, the holes being directly at the ends of the layers of straw. Holes may be also made at the bottom of the hive.

The straw, being naturally an absorbent, will imbibe the moisture from the interior of the hive, and this moisture will be carried off by the air circulating through and around the straw. The straw, being also a slow conductor of heat, will keep the hive warm. Thus, by this arrangement, the bees are kept dry, warm and healthy.

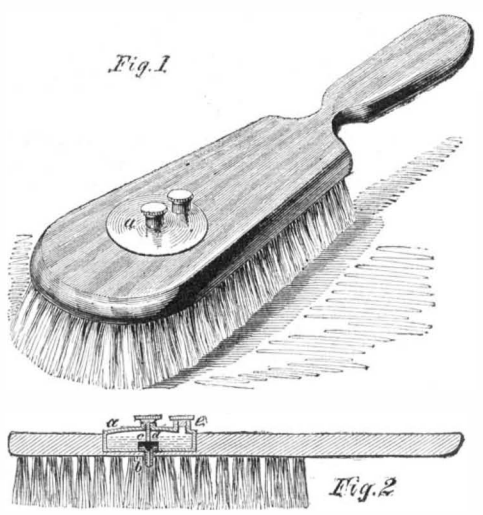
The patent for this invention was secured through the Scientific American Patent Agency, April 2, 1861, and further information in relation to it may be obtained by addressing the inventor, Samuel Ide, at East Shelby, N. Y.

RIFLING GUNS.—In Cincinnati, Greenwood's machine establishment has commenced rifling old muskets, and it is declared after trial that they are made equal to the English Enfield rifle. Using the conical ball, they were found effective at eleven hundred yards. At seven hundred and fifty yards the firing was remarkably accurate, and the balls penetrated several inches into a dry oak tree. Mr. Greenwood has a contract to rifle thirty thousand muskets now in the possession of the State of Ohio. He is able to rifle five hundred per day. The vast amount of arms required for the war would certainly warrant the expense of fitting up new machinery for this purpose, and as most of the large factories are doing comparatively little at their usual employments, this new branch of business would be found profitable. It is certainly necessary that we should be independent of every other nation for the supply of arms necessary to maintain the authority of the laws.

INGERSOLL'S MECHANICAL HAIR BRUSH.

Our inventors are not satisfied with patenting mixtures for oiling the hair, but an improved mode of applying the oil has now been secured by Letters Patent under the broad seal of the United States and the huge two pound seal of England. Instead of handling a bottle, invariably smeared with oil upon the outside, a slight turn of a clean, silver-headed screw deposits a few drops of oil upon a soft part of the brush, and any lady may dress her hair without in the least soiling her fingers.

The patent brush by which this is effected is illustrated in the annexed cut. A metallic reservoir, *a*,



Figs. 1 and 2, is let into the back of the brush, and directly below this reservoir is a soft mass of very fine bristles in place of the coarser bristles of which the remainder of the brush is composed. From the bottom of the reservoir a small tube, *b*, perforated with holes at its lower end, leads down to the middle of the soft mass of fine bristles. This tube is closed by a valve, *c*, which may be raised by turning the screw, *d*, so as to allow a small quantity of oil to flow through the tube. The top of the reservoir is made convex and thin, so that, by pressing it down, the oil can be forced out. A tube, *e*, with a cap is provided for filling the reservoir.

The patent also covers the same principle of feeding a brush in its application to paint and marking brushes. The handle of the brush is made hollow with flexible sides which may be pressed inward to force out the paint or marking material with which the hollow handle is filled.

The patent for this neat and convenient brush was granted, through the Scientific American Patent Agency, May 22, 1860, and subsequently in England, and further information in relation to it may be procured by addressing the inventor, John R. Ingersoll, at No. 102 John-street, New York.

PURIFYING IRON FOR MAKING STEEL.—A patent has lately been taken out in England by J. & D. F. Bower for purifying iron as follows:—The patentees take wrought iron, 40 lbs., in scrap, and add to it 20 ounces of perchloride of iron, 6 ounces of charcoal, 2 ounces of salt and 2 ounces of oxyd of manganese. Put these in a suitable crucible and smelt them in a furnace. By adding 3 lbs. of the perchloride of iron to every 112 lbs. of cast iron in a puddling furnace, a very superior quality of wrought iron is produced.

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MUNN & CO., Publishers,
No. 37 Park-row, New York.

FROM THE STEAM PRESS OF JOHN A. GRAY.

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